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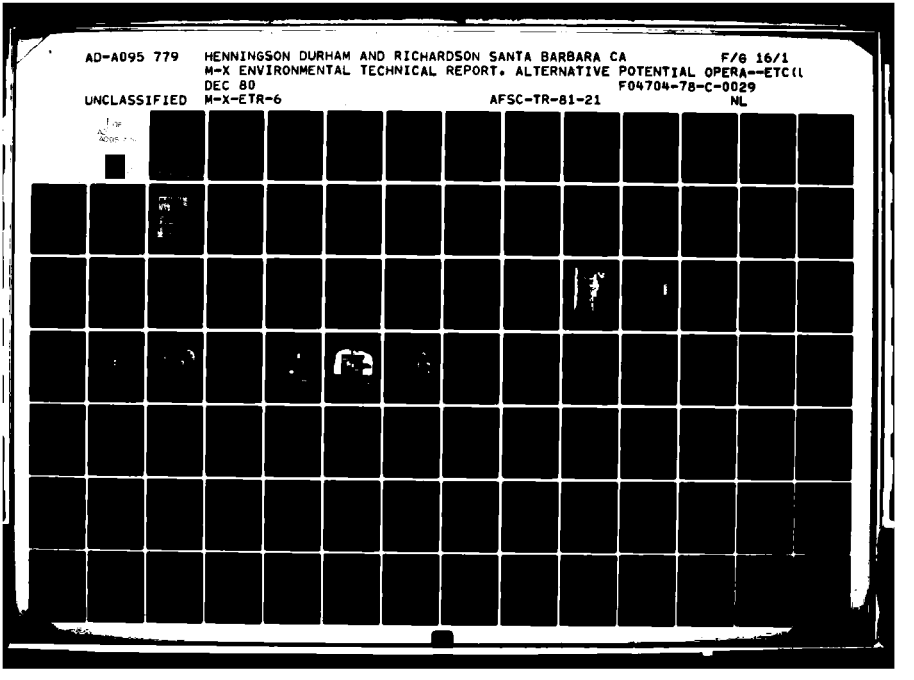

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M-X
ENVIRONMENTAL
TECHNICAL REPORT

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The area of analysis (AOA) for the Beryl operating base location includes Iron County, Utah. The AOA is located in the southeastern section of the designated region of influence.

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M-X ETR-6

ALTERNATIVE POTENTIAL OPERATING BASE LOCATIONS: BERYL

Prepared for

United States Air Force
Ballistic Missile Office
Norton Air Force Base
California

By

Henningson, Durham & Richardson
Santa Barbara, California

22 December 1980

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1.0 BERYL AND VICINITY COMMUNITY ENVIRONMENT

The area of analysis (AOA) for the Beryl operating base location includes Iron County. The AOA is located in the southeastern section of the designated region of influence, as shown in Figure 1.0-1.

1.1 HUMAN ENVIRONMENT

ECONOMIC ACTIVITY (1.1.1)

Employment

Table 1.1.1-1 indicates the relative dependence of the county's economy on the government sector which alone, comprised 27 percent of the county's total employment in 1977. Other sectors, notably manufacturing and services, traditionally dominate a well-balanced economic base, however in Iron County, manufacturing employment comprised only 6 percent in 1977 and services, 10 percent. These percentages were well below both the state and national averages for employment shares in these sectors.

Table 1.1.1-2 presents 10-year employment growth figures and indicates that the number of jobs in Iron County increased by almost one-third between 1967 and 1977. The government sector had an average annual growth rate of 4 percent during that period and continuously provided about one-quarter of the total number of jobs in the county. The services industry grew by 5 percent per year while construction and manufacturing recorded average annual growth rates of 4 percent. Agricultural employment declined by about 1 percent per year while the mining sector remained relatively unchanged.

Income and Earnings

Adjusted for inflation, total earnings in Iron County grew by 3 percent per year over the 1967-1977 period (Table 1.1.1-3). The government sector experienced the largest aggregate and percentage earnings growth, increasing in real terms from $10 million in 1967 to $16 million in 1977 at an average annual growth rate of 5 percent. Agricultural earnings decreased by about $6 million (an average annual decline of almost 17 percent) during the same period. Other industries increased earnings by 3-5 percent annually except the mining sector which averaged only a one-percent rate of growth per year.

Table 1.1.1-4 highlights per capita income and earnings shares by major industry in Iron County. The county's 1977 per capita income of $4,693 was about 79 percent that of Utah's and only 67 percent of U.S. per capita income. By industrial source, government contributed almost one-third of Iron County's total 1977 earnings. The agricultural share of total earnings was only two percent, well below what employment in this industry would have indicated. This implies that agricultural workers received relatively lower compensation than workers in other industries.

PUBLIC FINANCE (1.1.2)

Principal governmental units in the Beryl and vicinity area include Iron County, Cedar City, and the Iron County School District. The area's tax base

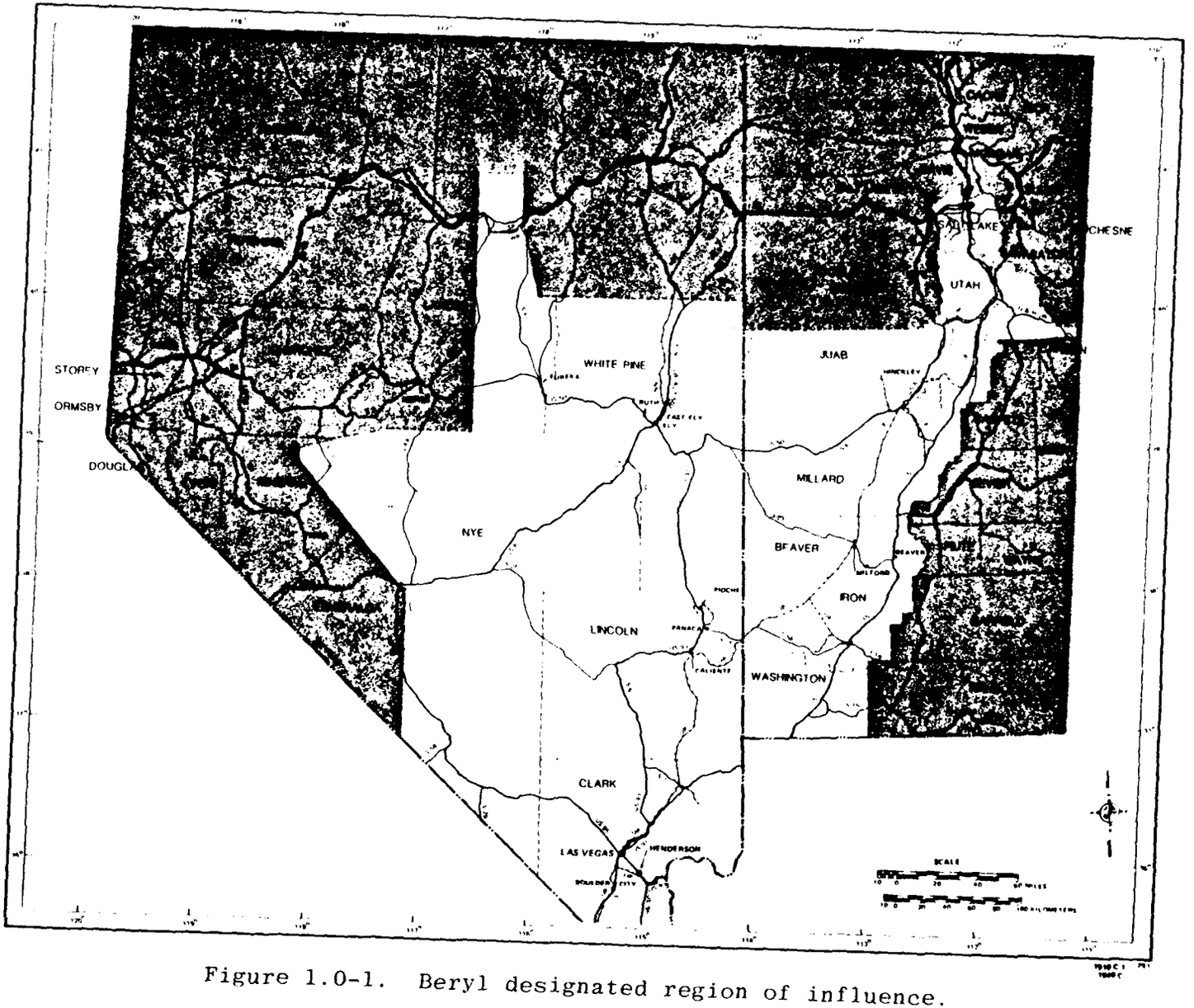

Figure 1.0-1. Beryl designated region of influence.

Table 1.1.1-1. Total employment and percent share by major economic sectors for selected counties in Utah, 1977.

COUNTY	TOTAL EMPLOYMENT 1977	PERCENT OF TOTAL STATE EMPLOYMENT	AGRICULTURE SHARE (%)	MINING SHARE (%)	CONSTRUCTION SHARE (%)	MANUFACTURE SHARE (%)	SERVICES SHARE (%)	GOVERNMENT SHARE (%)
Beaver	1,726	0.3	18.2	1.3	2.6	8.6	(D)	20.4
Davis	50,061	9.1	2.2	0.1	4.6	9.3	9.2	51.1
Iron	6,517	1.2	9.4	3.9	5.0	6.2	9.8	26.7
Juab	2,150	0.4	13.2	(D)	(D)	25.8	7.3	20.7
Millard	3,416	0.6	30.9	1.8	1.2	6.8	6.4	21.4
Salt Lake	272,043	49.4	0.5	2.3	5.9	13.9	16.8	17.3
Tooele	10,959	2.0	3.1	0.6	10.0	9.7	4.5	57.1
Utah	59,393	10.8	4.6	7.0	6.1	20.0	20.6	16.6
Washington	6,365	1.2	6.9	0.4	7.0	7.9	11.9	21.4
Weber	49,011	8.9	2.3	0.1	4.8	11.4	14.5	30.2
Utah State Total	550,214		3.7	2.7	5.8	13.5	14.7	23.2
U.S.	97,898,874		4.2	4.2	4.0	20.1	17.4	18.2

060

(D) Not shown to avoid disclosure of confidential data.

Source: Bureau of Economic Analysis, April 1979.

Table 1.1.1-2. Employment growth by sector, selected counties in Utah, 1967 to 1977.

COUNTY	TOTAL			AGRICULTURE			MINING			CONSTRUCTION			MANUFACTURING			SERVICES			GOVERNMENT		
	1967	1977	Δ[1]	1967	1977	Δ	1967	1977	Δ	1967	1977	Δ	1967	1977	Δ	1967	1977	Δ	1967	1977	Δ
Beaver	1,625	1,726	0.6	340	312	-0.9	(D)[2]	23	(D)	(D)	45	(D)	(D)	149	(D)	129	(D)	(D)	281	352	2.3
Davis	40,034	50,061	2.3	1,231	1,084	-1.3	49	14	-11.8	710	2,323	12.6	3,122	4,662	4.1	2,044	4,626	8.5	26,429	26,560	0.6
Iron	4,499	6,517	3.8	671	610	-0.9	244	255	0.4	176	327	6.4	270	405	4.1	393	637	4.9	1,154	1,743	4.2
Juab	2,116	2,150	0.2	343	284	-1.9	198	(D)	(D)	(D)	(D)	(D)	436	554	2.4	97	158	5.0	482	445	-0.8
Millard	2,944	3,416	1.5	1,073	1,055	-0.2	(D)	62	(D)	52	42	-2.1	61	232	14.3	204	217	0.6	688	732	0.6
Salt Lake	180,651	772,043	4.2	1,604	1,443	-1.1	5,418	6,263	1.5	7,148	16,143	8.5	25,832	37,812	3.9	28,459	45,600	4.8	29,853	47,145	4.7
Tooele	11,514	10,959	-0.5	347	341	-0.2	136	70	-6.4	195	1,094	18.8	554	1,066	6.8	335	495	4.0	8,599	6,254	-3.1
Utah	37,804	59,393	4.6	3,192	2,708	-1.6	225	417	6.4	1,543	3,620	8.9	8,317	11,899	3.6	7,163	12,231	5.5	6,570	9,883	4.2
Washington	3,950	6,365	4.9	579	442	-2.7	(D)	28	(D)	195	444	8.6	187	503	10.4	460	757	5.1	961	1,365	3.6
Weber	44,667	49,011	0.9	1,335	1,147	-1.5	17	49	11.2	1,523	2,344	4.4	4,855	5,590	1.4	5,526	7,111	2.6	14,866	14,805	-0.1
State Total	391,289	550,214	3.5	23,091	20,244	-1.3	10,330	14,825	3.7	13,676	31,814	8.8	50,216	73,997	4.0	49,981	80,646	4.9	104,014	127,463	2.1
U.S. Total (in millions)	82.5	97.8	1.7	4.6	4.2	-1.2	.6	.8	3.0	3.3	3.9	1.6	19.5	19.7	0.1	12.7	17.0	3.0	13.9	17.8	2.5

[1] Δ - average annual growth rate.

[2] (D) - not shown to avoid disclosure of confidential information.

[3] Rate in doubt because of large number of data points withheld by disclosure rules.

Source: BEA, April, 1979.

Table 1.1.1-3. Total earnings growth by sector, selected counties in Utah, 1967 to 1977.

COUNTY	TOTAL EARNINGS			AGRICULTURE			MINING			CONSTRUCTION		
	1967	1977	GROWTH RATE	1967	1977	GROWTH RATE	1967	1977	GROWTH RATE	1967	1977	GROWTH RATE
Beaver	13.26	13.9	0.5	2.5	35	-13.2	(D)	40	(D)	(D)	[illegible]	(D)
Davis	166.5	402.5	2.6	1.85	1.61	-0.6	72	38	-6.2	11.42	39.6	13.2
Iron	39.94	54.19	3.1	5.8	96	-16.5	3.6	4.03	1.1	2.8	8.52	4.9
Utah	15.96	14.33	-1.1	1.68	83	-6.8	2.96	2	-23.6	10	5	-7.3
Millard	18.33	22.1	1.9	5.8	4.65	-2.2	(D)	97	(D)	4.7	8.1	1.9
Salt Lake	1957.3	3108.3	4.7	9.29	7.31	-2.4	83.84	141.69	5.4	120.2	271.3	8.5
Tooele	129.2	142.6	1.3	65	1.78	10.6	1.95	43	-14.0	3.33	21.12	21.0
Wasatch	370.3	640.3	5.6	14.49	9.52	-4.1	3.2	6.6	7.5	24.33	53.2	8.1
Washington	29.36	49.96	5.8	3.25	2.35	-3.2	(D)	39	(D)	2.55	7.51	4.0
Weber	432.1	832.3	6.3	6.74	2.37	-9.9	1	1.27	28.9	26.19	76.8	7.8
State		6019.5	4.2	119.2	82.4	-3.6	155.4	310.15	7.2	226.1	542.65	9.1
U.S.	921,344	1,164,755	2.4	31,950.7	26,161	-2.0	9,715.6	10,115	0.8	54,710.6	69,617	2.4

COUNTY	MANUFACTURING			SERVICES			GOVERNMENT		
	1967	1977	GROWTH RATE	1967	1977	GROWTH RATE	1967	1977	GROWTH RATE
Beaver	(D)	36	(D)	34	9	0.0	2.29	3.03	2.8
Davis	43.68	63.48	8.3	20.04	48.18	9.2	143.5	369.63	9.2
Iron	2.19	3.71	5.4	4.48	6.14	1.2	9.9	15.95	4.9
Utah	4.53	5.16	1.3	64	1.13	5.8	2.66	3.08	1.5
Millard	.52	1.45	10.8	1.44	1.57	0.9	4.67	5.57	1.8
Salt Lake	343.1	195.5	3.7	297.8	492.3	5.2	301.6	458.1	4.1
Tooele	7.12	17.31	9.5	1.03	4.06	3.0	104.3	86.14	1.7
Wasatch	118.2	202.0	5.5	75.85	145.3	6.7	58.81	97.6	4.2
Washington	1.44	5.19	13.6	3.83	7.23	6.6	7.47	11.42	4.3
Weber	57.66	69.22	1.8	55.36	72.36	2.7	149.2	154.7	0.4
State	657.7	1011.2	4.4	510.	856.5	5.3	1102.8	1319.8	2.1
U.S.	269,026	305,737	1.3	135,751	191,246	3.6	151,707	199,470	2.8

Table 1.1.1-4. Per capita income and earnings shares by major industry in Beaver County, 1967 to 1977.

COUNTY	1977 PER CAPITA INCOME	TOTAL 1977 EARNINGS ($000s)	AGRI-CUL-TURE SHARE (%)	MIN-ING SHARE (%)	CON-STRUC-TION SHARE (%)	MANU-FACT-URING SHARE (%)	SERV-ICES SHARE (%)	GOVERN-MENT SHARE (%)
Beaver	$5,114	$ 13,900	6.9	3.4	8.2	6.9	5.8	21.8
Davis	5,860	602,505	0.6	0.1	6.6	11.6	8.0	58.0
Iron	4,693	54,175	1.8	7.4	8.4	6.8	11.3	29.4
Juab	3,797	14,328	5.8	4.9	2.8	36.0	7.9	21.5
Millard	3,978	22,296	20.8	4.3	3.6	6.5	7.0	25.0
Salt Lake	6,712	3,108,320	0.2	4.6	8.7	15.9	15.8	14.7
Tooele	5,684	142,636	1.2	0.3	14.8	12.6	2.8	60.4
Utah	4,854	640,317	1.5	1.0	9.2	31.5	22.7	13.7
Washing-ton	4,381	49,961	4.7	0.8	11.0	10.8	14.5	22.9
Weber	6,158	492,894	0.5	0.3	7.5	14.0	14.8	31.4
State	$5,943	$6,010,516	1.4	5.2	9.0	16.8	14.2	22.3
United States	$7,026	$1,164,755[1]	2.2	1.6	6.0	26.2	16.6	17.1

[1] ($millions)

Source: BEA, 1979.

575

amounts to approximately $73.8 million for Iron County and $26.5 million for Cedar City (Table 1.1.2-1). The revenue structure of the potentially affected government units reflect a balance between inter-governmental revenue sharing and locally raised revenue sources. Tables 1.1.2-2 and 1.1.2-3 indicate the levels of revenues and expenditures in Iron County and Cedar City. Intergovernmental revenue transfers account for 43.8 percent and 55.1 percent in Cedar City and Iron County, respectively. It is noted that these revenues are approximately of the same order as locally raised revenue (property taxes fines and fees, licenses and permits) which contribute 42.7 percent in Cedar City and 45 percent in Iron County.

Public works expenditures contribute the largest single expenditure category in both Cedar City and Iron County, accounting for 32.7 percent and 34 percent of total general fund expenditures, respectively. Administrative disbursements, however, vary dramatically between the jurisdictions, with Iron County, devoting 31.3 percent to this category and Cedar City 15.1 percent. Both jurisdications spend on average 20 percent of the general fund on public safety.

School district revenues and expenditures follow similar patterns across all districts in the state of Utah. Instruction expenses account for the largest single outlay (Table 1.1.2-4), approximately 59 percent of total expenditures, excluding capital outlay and debt service. Fixed charges (insurance, pension payments) and operation and maintenance of the physical plant account for another 31 percent of expenditures. Revenues for the iron County School District depend heavily on state revenues. These revenues account for over 64 percent of total disbursements, excluding capital outlay and debt service, more than double that of the local contributions. Federal sources of approximately $223,000 (51 percent) are generally earmarked for special education and health programs and do not account for a major share of revenues (Table 1.1.2-5).

In summary, local governments in the Beryl and vicinity area have only adequate fiscal structures to support expected future growth. Due to the relatively low tax bases of the governmental units, reserve bonding capacities are relatively low and would be pressed to support long-term financing of major projects. Reserve bonding capacity for Iron Conty is satisfactory, while the school district and Cedar City have reserve bonding capacities fo only $3.4 million and $1.8 million, respectively.

POPULATION AND COMMUNITIES (1.1.3)

Iron County, Utah, the area of analysis for the operating base proposed near Beryl in Alternatives 1, 3 and 4, had an estimated population of 15,444 in 1977, an increase of 26.8 percent since 1970. According to preliminary 1980 census data, the county's population had further increased to 17,304 by April 1, 1980, 42.1 percent more than in 1970. The population density in 1980 of about 5.2 persons per square mile, is concentrated in Cedar City, with 63 percent of the county's population in 1980, and in the series of small communities along the Interstate 15 corridor. Adjacent Washington and Beaver counties, which may experience lesser effects from the proposed base, had populations of 26,002 and 4,377 respectively, according to preliminary 1980 census data. Washington County's population increased by 90 percent since 1970, while Beaver grew at a much slower pace, about 15 percent.

Data for 1970 on the spatial distribution and age composition of the populations of Iron, Washington, and Beaver counties, shown in Table 1.1.3-1, indicates

Table 1.1.2-1. Assessed valuation, indebtedness limitations and reserve bonding capacity.

JURISDICTION	ASSESSED VALUE	INDEBTEDNESS LIMITATION	OUTSTANDING G.O. BONDS	RESERVE BONDING CAPACITY
Iron County	$ 73,797,487	$ 5,903,799	$ 220,000	$ 5,683,799
School District[1]	$ 82,849,293	$10,304,655	$ 6,645,000	$ 3,359,655
Cedar City	$ 26,459,230	$ 4,233,477	$ 2,432,000	$ 1,801,477

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[1] School Year 1978-79

Source: (a) Auditors Office, Iron County and Cedar City, 1979.
(b) Statistical Review of Government in Utah, 1979 Edition.
(c) Annual Report of the State Superintendent, Utah State Office of Education, 1978-1979.

Table 1.1.2-2. General fund revenue and expenditures, Iron County, Utah, for selected years.

REVENUES	1977	1978
Property Tax	$ 500,000	$ 329,910
License and Permit	7,159	10,349
I-G Revenues	973,276	926,912
Fines and Fees	289,064	314,050
Other	23,829	100,228
Total Revenues	1,793,781	1,681,449
EXPENDITURES		
Administration	406,639	506,745
Public Safety	166,681	300,968
Health and Welfare	63,247	92,258
Public Works	537,050	550,487
Parks and Recreation	24,516	30,667
Other	43,728	43,202
Transfers-to	216,725	94,218
Total Expenditures	1,458,586	1,618,545

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Source: Iron County, *General Fund Statement of Revenues and Expenditures, 1977 and 1978.*

Table 1.1.2-3. General fund revenues and expenditures, Cedar City, Utah, fiscal year 1978-1979.

REVENUES	AMOUNTS
Property Taxes	$ 380,593
License and Permits	87,135
Intergovernmental Revenue	878,692
Fines, Fees and Charges	390,149
Other	71,239
Transfers-IN	199,554
Total Revenues	2,007,362
EXPENDITURES	**AMOUNTS**
Administrative	306,351
Public Safety	457,362
Health and Welfare	279
Public Works	662,895
Parks and Recreation	277,402
Other	41,554
Transfers-OUT	282,859
Total Expenditures	2,028,702

1017

Source: Cedar City, General Fund, Statement of Revenues and Expenditures, FY 1978-79.

Table 1.1.2-4. Summary of expenditures, by funds, Iron County School District, 1977-1978.

EXPENDITURES	IRON
Maintenance and Operating Fund	
Administration	$ 121,268
Instruction	2,647,251
Health Services	14,528
Transportation	160,414
Operation of Plant	377,155
Maintenance of Plant	228,323
Fixed Charges	840,258
Other	73,132
Total Maintenance and Operating Fund	4,462,329
Capital Outlay and Debt Service Funds	
Capital Outlay	1,872,937
Sites	181,789
New Buildings	1,427,275
Remodeling	28,598
Other	235,275
Debt Service	530,715
Total Capital Outlay and Debt Service Funds	2,403,652
Food Service Fund	322,092
Other Funds	356,866
Total - All Funds	7,544,939

1018

Source: Utah Office of the State Superintendent of Public Instructions, 1978. 1977-1978 *Annual Report of the State Superintendent*.

Table 1.1.2-5. Summary of revenues, by funds, Iron County School District, fiscal year 1977-1978.

REVENUES	IRON
Maintenance and Operating Fund	
Local Revenue	$ 1,324,693
Property Taxes	1,237,971
Other	86,722
State Revenues	2,841,104
Basic School Program	2,031,863
Other	808,241
Federal Revenues	223,346
Transfer Payments-In State	5,775
Total Maintenance and Operating Fund	4,394,918
Capital Outlay and Debt Service Fund	
Local Revenues	1,183,876
Property Taxes	961,858
Other	222,018
State Revenue	—
Federal Revenue	4,500
Non-Revenue	3,407,598
Sale of Bonds	3,400,000
Other	7,598
Total Capital Outlay and Debt Service Fund	4,595,974
School Food Services Fund	328,079
Other Funds	353,953
Total All Funds	9,672,924

1021

Source: Utah Office of the State Superintendent of Public Instruction, 1978. *1977-78 Annual Report of the State Superintendent.*

Table 1.1.3-1. Selected population characteristics in the Nevada/Utah impact region. (Page 1 of 2).

STATE COUNTY	POPULATION				POPULATION DENSITY (1975) PERSONS/MI²
	1960	1970	1975	1977	
Nevada					
Clark	127 016	273 288	330 711	361 196	42
Eureka	707	948	1 072	1 119	1
Lincoln	2 481	2 337	2 647	2 687	1
Nye	4 374	5 599	5 [illegible]	6 113	1
White Pine	9 503	10 150	10 221	9 778	1
Utah					
Beaver	4 331	3 509	4 056	4 179	2
Iron	13 736	12 177	14 [illegible]	15 444	4
Juab	4 597	4 374	4 947	5 156	1
Millard	7 300	6 955	7 875	8 297	1
Salt Lake	383 [illegible]	1[illegible] 807	512 [illegible]	541 533	670
Utah	108 891	137 778	160 745	177 106	82
Washington	13 371	13 909	15 127	19 509	7
Nevada	285 275	488 738	500 [illegible]	558 892	5
Utah	890 227	1 [illegible]	1 [illegible]	1 [illegible]	15

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Table 1.1.3-1. Selected population characteristics in the Nevada/ Utah impact region. (Page 2 of 2).

STATE COUNTY	RURAL - URBAN DISTRIBUTION (1970)			AGE DISTRIBUTION (1970)				MEDIAN AGE (1970) IN YEARS
	PERCENT RURAL FARM	PERCENT RURAL NON-FARM	PERCENT URBAN	PERCENT UNDER 5	PERCENT 5-17	PERCENT 18-64	PERCENT 65+	
Nevada								
Clark	0.4	5.1	94.5	9.5	26.4	59.0	5.1	27.0
Eureka	30.1	69.9	0	11.4	22.9	60.1	5.6	30.5
Lincoln	12.7	87.3	0	9.7	32.4	47.7	10.2	27.5
Nye	5.0	95.0	0	8.3	24.2	60.4	7.1	30.1
White Pine	2.2	56.7	41.1	10.0	28.2	53.9	7.9	26.3
Utah								
Beaver	8.4	91.6	0	8.4	28.7	51.3	11.6	29.7
Iron	3.9	21.5	74.7	10.5	25.9	56.0	7.6	22.4
Juab	2.6	27.9	66.4	10.2	28.3	49.3	12.2	27.5
Millard	15.0	85.0	0	9.3	31.4	46.8	12.5	27.9
Salt Lake	0.6	4.2	95.1	10.6	29.1	52.7	7.6	23.9
Utah	2.6	9.9	87.6	10.9	26.8	56.3	6.0	21.7
Washington	2.9	45.4	51.8	10.2	29.3	48.2	12.3	22.4
Nevada	2.1	17.0	80.9	8.9	26.0	58.8	6.3	27.9
Utah	3.1	16.5	80.6	10.6	29.6	52.5	7.3	23.0

4026

Sources: U.S. Bureau of the Census. 1975 County and City Data Book. 1977 Population Estimates for Counties and Incorporated Places (Nos. 841 and 857), and 1970 Census of Population.

that about one-fourth of Iron's population resides in rural areas, although few lived on farms, while all of Beaver's population and about 50 percent of Washington's were classified as rural non-farm. All these counties had an age structure which was slightly older than the state of Utah's as a whole. Persons of school age constituted 25.9 percent, 29.3 percent and 28.7 percent of the total population in Iron, Washington, and Beaver counties, respectively.

Components of population change including net migration and natural increase, or excess of births over deaths, are presented in Table 1.1.3-2 for the periods 1960 to 1970 and 1970 to 1976. Both Iron and Washington counties experienced population increases due to net in-migration as well as natural increase, while Beaver County has had modest out-migration since 1970. The Census Bureau has estimated that Iron County experienced net in-migration since 1970 equal to seven percent of its population in that year, more than twice the rate of in-migration to the state of Utah as a whole.

Projections of future population in the three counties, presented in Table 1.1.3-3 and Figure 1.1.3-1, indicate a continued pattern of moderate population growth with the highest growth rate in Washington County. Iron County is projected to reach a population of over 24,500 by 1994, with a growth rate of 3.1 percent annually between 1980 and 1985 declining to 2.4 in the period 1985 to 1990 and to 1.8 between 1990 and 1994, as shown in Table 1.1.3-4.

LAND USE (1.1.4)

Community Land Use

Beryl in western Iron County, Utah, serves the ranching and farming activities in the Escalante Valley. Iron County lies within the region of the Five County Organization and receives A-95 reviews from the regional agency. In 1975 Iron County withdrew as a member of the Organization while the incorporated communities in Iron County have retained their memberships.

In 1973, Iron County adopted a countywide master plan. Since that time the plan has acted as the policy statement for future growth and development for the unincorporated area of Iron County and the incorporated communities except Cedar City. The Cedar City master plant was updated in 1979. Figure 1.1.4-1 graphically shows the 1972 Iron County Master Plan. Data on the urban land uses in Beryl was not provided in the 1972 master plan due to the small size of Beryl relative to the other communities in Iron County.

Significant to planning in Iron County is the land ownership pattern (see Table 1.1.4-1). The interesting factor in land ownership in Iron County is the relatively large amount of privately owned lands: 747,276 acres. Most southwestern Utah and southeastern Nevada counties are largely public land. While large amounts of land in Iron County are under public control, the amount of private land is almost double the private land found in Washington and Beaver Counties combined.

In Iron County, less than 100,000 acres of land is devoted to all types of cropland (Five County Association, 1978A). Much of the private land would be suitable for development, but the greatest restraint to developing land for either agriculture or urban purposes is a lack of irrigation and/or culinary water.

Table 1.1.3-2. Population change and components of change, 1960 to 1970, and estimated 1970 to 1976 change, by county, in the Nevada/Utah impact region. (Page 1 of 2).

STATE/ COUNTY	ACTUAL POPULATION 1970	POPULATION CHANGE 1960-1970					
		COMPONENTS OF CHANGE				TOTAL CHANGE	
		NATURAL INCREASE		NET MIGRATION			
		NO.	PERCENT	NO.	PERCENT	NO.	PERCENT
Nevada							
Clark	273,288		29.8		85.4		115.2
Eureka	948		-2.5		26.1		23.6
Lincoln	2,557		4.6		0.6		5.2
Nye	5,599		8.1		19.9		28.0
White Pine	10,150		11.6		-8.1		3.5
Utah							
Beaver	3,800		9.3		-21.6		-12.3
Iron	12,177		16.4		-3.6		12.8
Juab	4,574		7.7		-8.2		-0.5
Millard	6,988		9.4		-20.6		-11.2
Salt Lake	458,607		18.8		0.9		19.7
Utah	137,776		23.1		5.7		28.8
Washington	13,669		16.8		16.3		33.1
Nevada	488,738		20.9		50.4		71.3
Utah	1,059,273		20.1		-1.2		18.9

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Table 1.1.3-2. Population change and components of change, 1960 to 1970, and estimated 1970 to 1976 change, by county, in the Nevada/Utah impact region. (Page 2 of 2).

STATE/ COUNTY	ESTIMATED POPULATION 1976	POPULATION CHANGE 1970-1976					
		COMPONENTS OF CHANGE				TOTAL CHANGE	
		NATURAL INCREASE		NET MIGRATION			
		NO.	PERCENT	NO.	PERCENT	NO.	PERCENT
Nevada							
Clark	343,400	21,200	7.7	48,900	17.9	70,100	25.6
Eureka	1,200	(2)	1.3	300	26.9	300	28.2
Lincoln	2,800	100	2.6	100	5.5	200	8.1
Nye	5,900	100	1.4	200	4.3	300	5.7
White Pine	10,000	700	6.6	-800	-7.9	-100	-1.3
Utah							
Beaver	4,100	400	8.7	(2)	-1.2	300	7.5
Iron	14,700	1,700	14.0	800	7.0	2,600	21.0
Juab	4,900	400	8.5	-100	-1.2	300	7.3
Millard	8,200	700	9.4	500	7.5	1,200	16.9
Salt Lake	524,700	53,100	11.6	13,000	2.8	66,100	14.4
Utah	170,300	27,200	19.7	5,300	3.9	32,600	23.6
Washington	18,700	1,900	13.9	3,200	23.2	5,100	37.1
Nevada	610,000	31,000	6.3	90,000	18.5	121,000	24.8
Utah	1,228,000	134,000	12.6	35,000	3.2	169,000	15.9

4029

Source: U.S. Bureau of the Census.

Table 1.1.3-3. Projected population by county, assuming trend growth and assuming growth related to energy and mineral development projects in some counties, Nevada/Utah impact region, 1980-1984. (Page 1 of 2)

STATE/ COUNTY	ESTIMATED POPULATION 1977[1]	PROJECTED POPULATION[2]			
		1980		1985	
		TREND GROWTH	HIGH GROWTH	TREND GROWTH	HIGH GROWTH
Nevada					
Clark	361,095	453,881	453,952	543,857	544,830
Eureka	1,119	1,089	1,089	1,169	1,169
Lincoln	2,857	3,657	3,658	4,043	4,049
Nye	6,113	8,267	8,268	10,799	10,804
White Pine	8,776	8,246	8,247	8,630	12,975
5-County Total	379,960	475,140	475,214	568,498	573,827
Utah					
Beaver	4,079	4,455	4,776	5,051	10,993
Iron	15,444	17,449	17,460	20,348	20,500
Juab	5,156	5,544	5,613	6,888	9,274
Millard	8,297	8,915	10,459	10,940	18,746
Salt Lake/ Utah	717,639	822,238	822,793	980,701	987,123
Washington	19,809	22,150	22,150	27,200	27,200
7-County Total	770,424	880,751	882,951	1,051,128	1,073,836
Deployment Region Total	1,150,384	1,355,891	1,358,165	1,619,626	1,647,663

4030

Table 1.1.3-3. Projected population by county, assuming trend growth and assuming growth related to energy and mineral development projects in some counties, Nevada/Utah impact region, 1980-1984. (Page 2 of 2).

STATE/ COUNTY	PROJECTED POPULATION[2]			
	1990		1994	
	TREND GROWTH	HIGH GROWTH	TREND GROWTH	HIGH GROWTH
Nevada				
Clark	623,794	624,539	686,699	687,585
Eureka	1,278	1,278	1,368	1,368
Lincoln	4,424	4,429	4,715	4,720
Nye	11,971	11,974	12,901	12,906
White Pine	9,545	13,902	10,238	15,050
5-County Total	651,012	656,122	715,921	721,629
Utah				
Beaver	5,297	9,965	5,516	10,566
Iron	22,895	23,006	24,556	24,677
Juab	7,650	8,364	8,077	8,849
Millard	12,179	14,920	12,528	15,504
Salt Lake/ Utah	1,079,131	1,083,344	1,144,685	1,149,699
Washington	31,150	31,150	33,802	33,802
7-County Total	1,158,302	1,170,749	1,229,164	1,243,097
Deployment Region Total	1,809,314	1,826,871	1,945,085	1,964,726

4030

[1]U.S. Bureau of the Census. 1977 Population Estimates for Counties and Incorporated Places. Series P-25. No. 841 (Nevada) and No. 857 (Utah). November 1979.

[2]Bureau of Economic and Business Research, University of Utah, 1980.

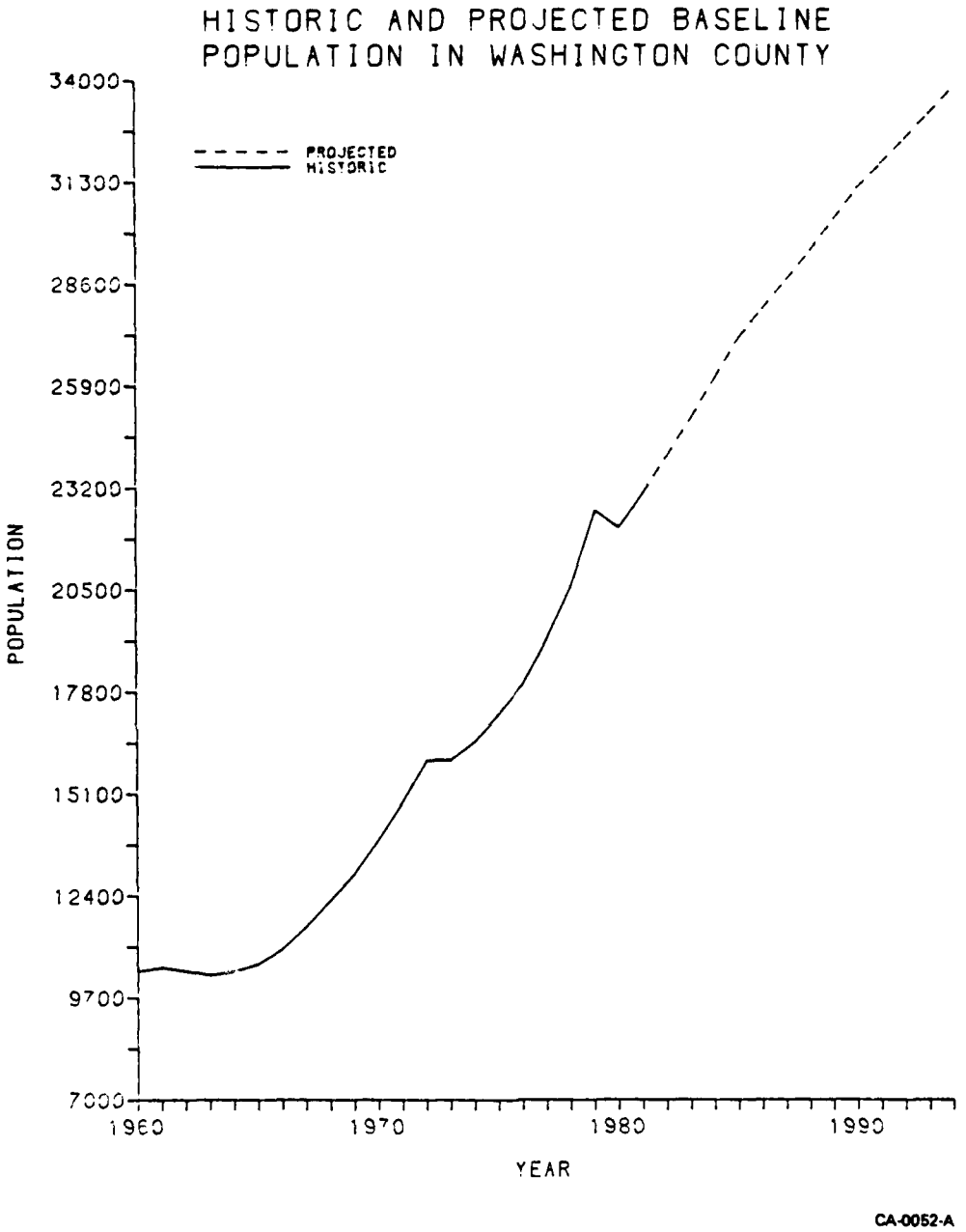

Figure 1.1.3-1. Historic and projected baseline population in Washington and Iron counties. (Page 1 of 2)

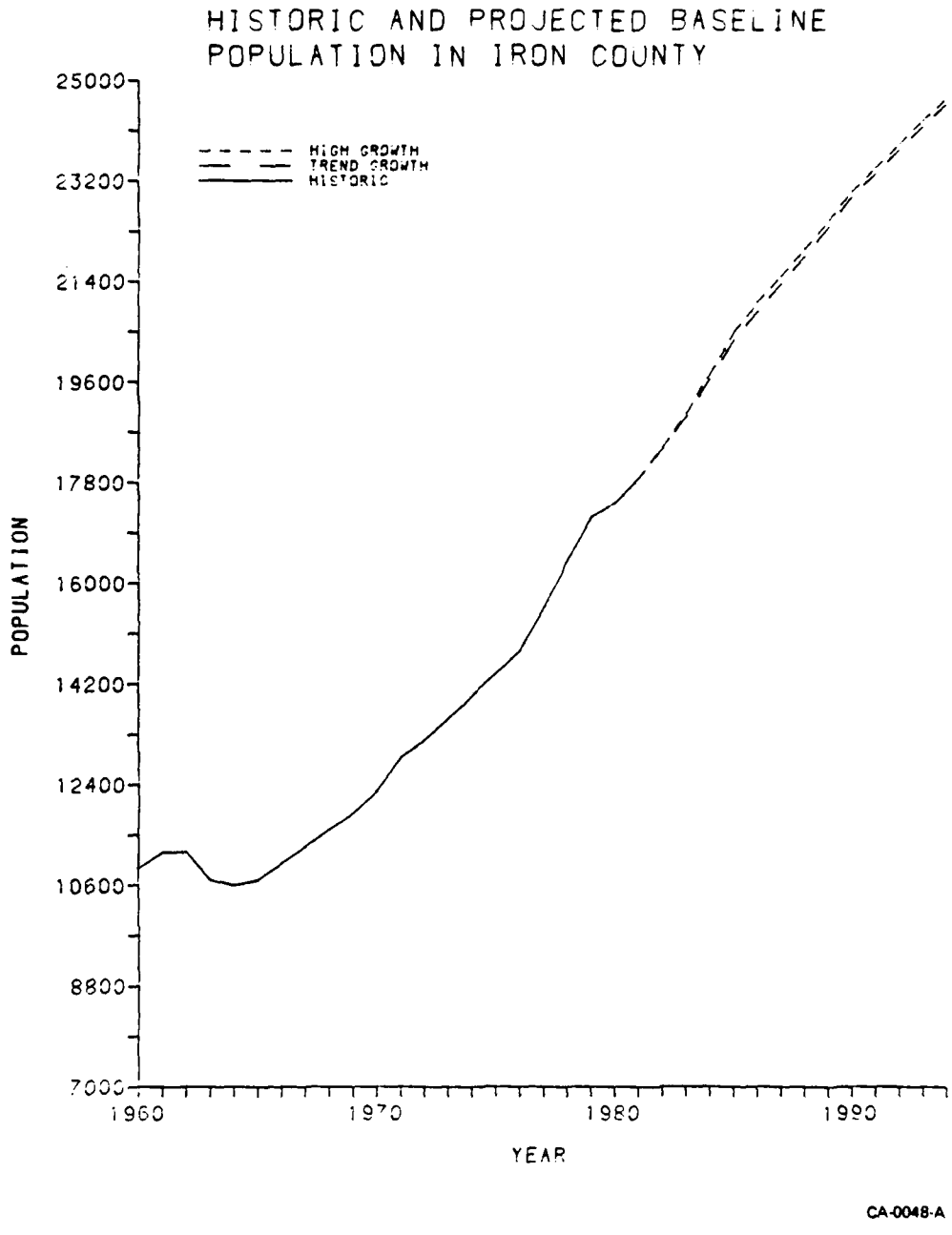

Figure 1.1.3-1. Historic and projected baseline population in Washington and Iron counties. (Page 2 of 2)

Table 1.1.3-4. Projected annual compound growth rates by county, assuming trend growth and high growth associated with energy and mineral development projects, Nevada/Utah impact region.

STATE COUNTY	PROJECTED ANNUAL COMPOUND RATES OF POPULATION CHANGE							
	1977-1980		1980-1985		1985-1990		1990-1995	
	TREND GROWTH	HIGH GROWTH	TREND GROWTH	HIGH GROWTH	TREND GROWTH	HIGH GROWTH	TREND GROWTH	HIGH GROWTH
Nevada								
Clark	7.92	7.93	3.08	3.22	2.78	2.77	2.49	2.47
Eureka	-0.90	-0.90	1.43	1.43	1.80	1.8	1.72	1.72
Lincoln	8.58	8.58	2.02	2.02	1.79	1.79	1.63	1.63
Nye	10.59	10.59	5.49	5.49	1.78	1.78	1.8	1.80
White Pine	-2.06	-2.06	0.91	0.49	1.04	1.04	1.17	1.2
5-County Total	7.74	7.74	3.05	3.14	2.77	2.76	2.4	2.47
Utah								
Beaver	2.98	5.40	2.54	18.14	1.99	-1.04	1.1	1.17
Iron	4.15	4.17	3.12	3.20	2.18	2.07	1.77	1.77
Juab	2.45	2.87	4.44	14.56	2.11	-1.04	1.77	1.42
Millard	2.42	8.02	4.18	12.38	2.17	-4.0	.71	.96
Salt Lake/Utah	4.64	4.66	3.56	3.71	1.97	1.84	1.49	1.5
Washington	3.79	3.79	4.19	4.19	2.77	2.77	2.56	2.56
7-County Total	4.56	4.62	3.60	3.99	1.96	1.84	1.5	1.51
Deployment Region Total	5.63	5.69	3.62	3.94	2.24	2.09	1.87	1.86

4031

Source: HDR Sciences, based on projections by the Bureau of Economic and Business Research, University of Utah, 1980.

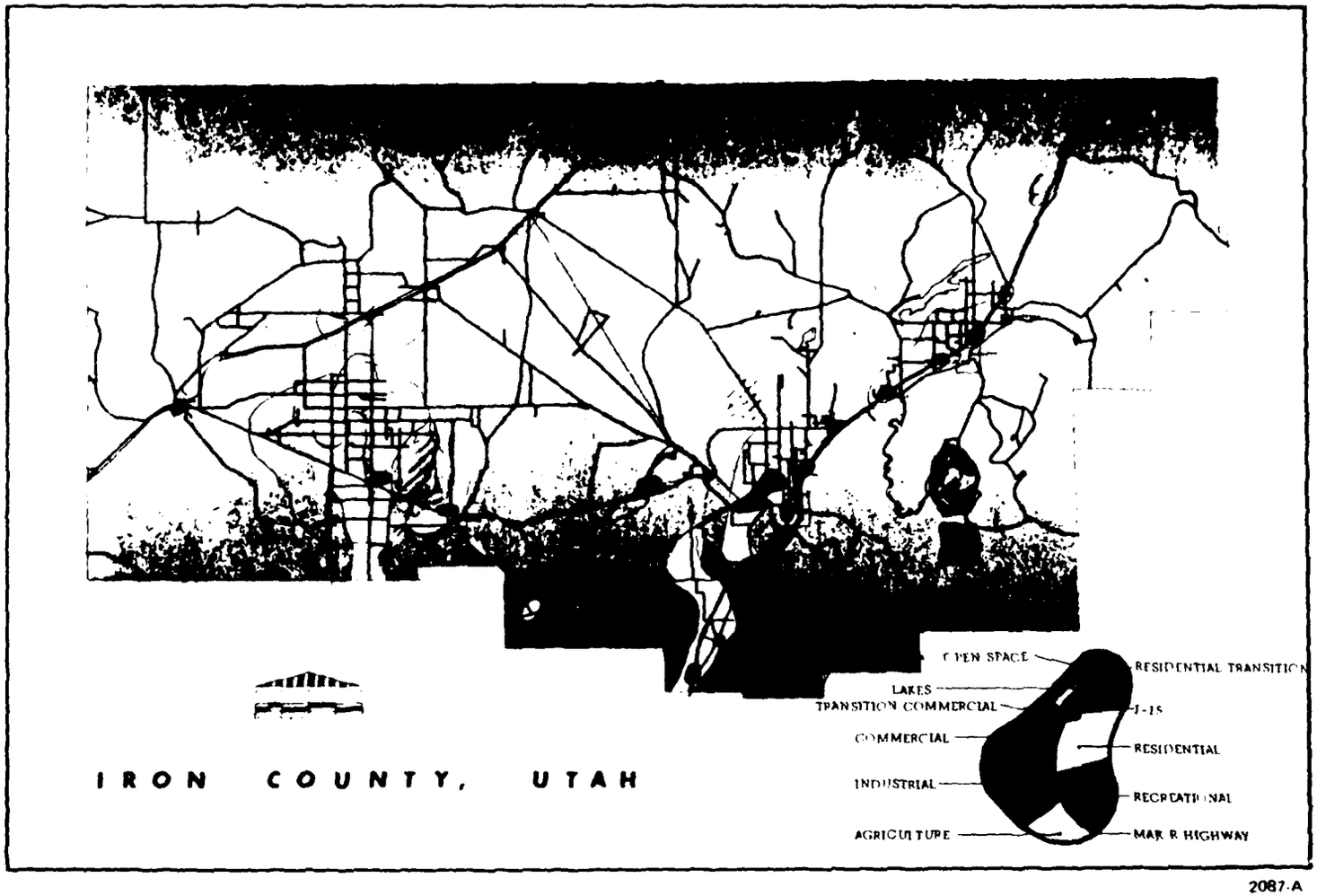

Figure 1.1.4-1. Master plan for Iron County, Utah (John C. Willie & Assoc., 1972).

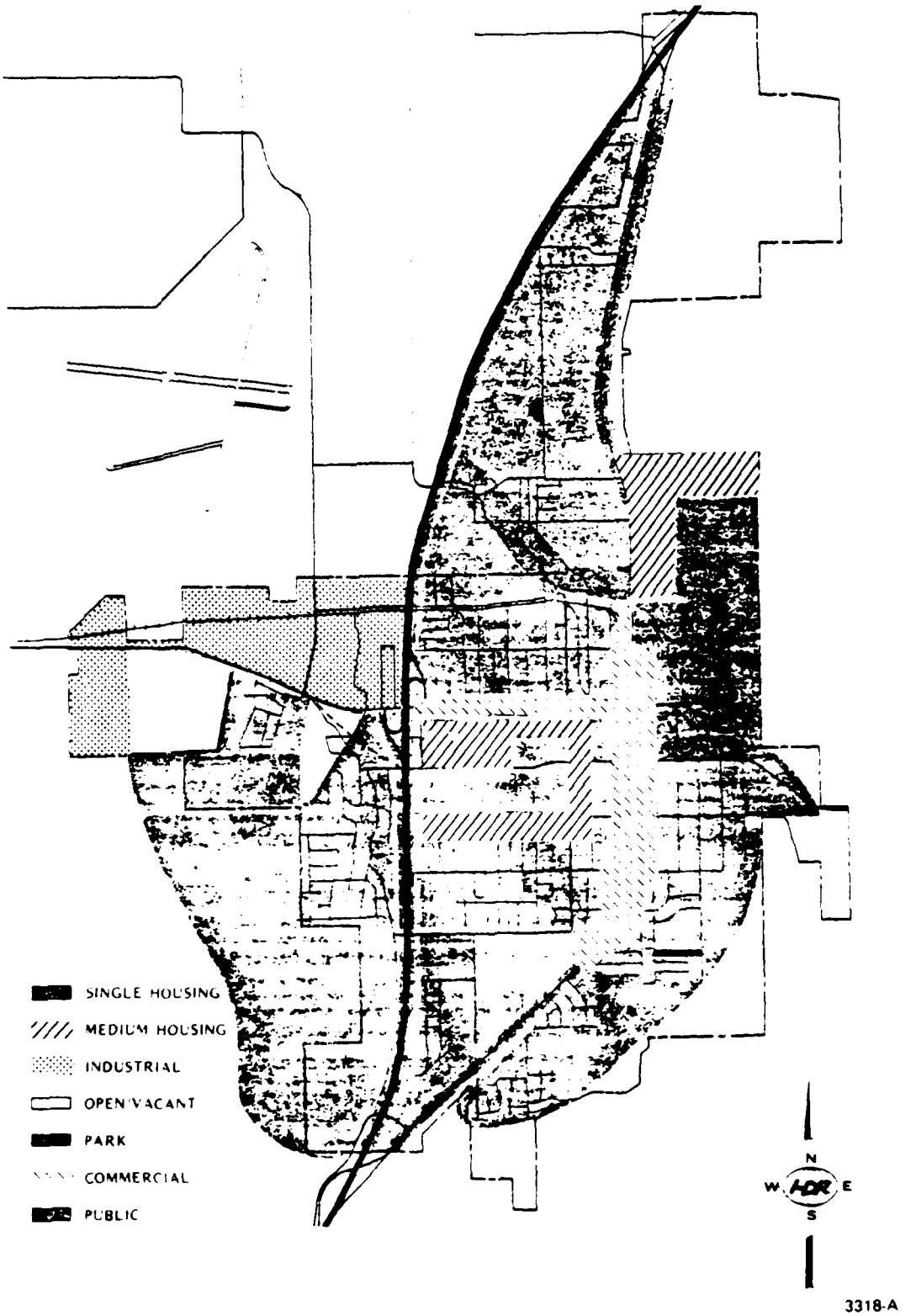

Figure 1.1.4-2. Master plan for Cedar City, Utah (1979).

Table 1.1.4-1. Land ownership in Iron County, Utah.

LAND USE	ACRES	HECTARES	PERCENT OF TOTAL
Federal Land	1,215,203	490,942	58
State Land	134,803	54,460	16
Private Land	747,276	301,899	36
Total	2,097,282	545,402	100

3420-1

Source: Five County Association, 1978, "Five County Development Plan".

In the 1972 Master Plan, Iron County set goals and established policies for development in the County. Some of the goals and policies most pertinent to the proposed M-X project are as follows:

- Proposals for land development must be able to show how they plan to provide for vehicular traffic, culinary water, sewage and solid waste, fire protection, schools, and all other services associated with urban development.

- Iron County can accommodate residents in the county through normal expansion of existing communities when services are already available and can be expanded.

- Residential growth should be encouraged in and around existing communities in order to allow for an easy expansion of utility services. Areas now unincorporated should be encouraged to develop through the annexation process wherever possible. Development in presently unincorporated areas should be done as "self-contained" developments to avoid creation of an undue tax burden upon county residents.

- Growth should be encouraged in a natural pattern through extension of existing residential areas to minimize tax costs of providing schools, libraries, parks, highways, police and fire protection, sewage, garbage collection and other public facilities.

- To maintain a high standard of development, residential land should be absorbed in a "reasonable" time period.

- Where the preservation of agricultural lands is not possible, water from these converted farm lands should also be converted from agricultural to culinary use.

- Agricultural lands should be protected through zoning or other means from urbanization.

- Quality mobile home parks and subdivisions should be developed.

- To help maintain a high degree of visual quality, mobile homes should be located in well planned mobile home parks and mobile home subdivisions.

- Commercial development should be confined to urbanized areas and should not be scattered at random along major highways.

- County highways should be identified in advance of need in order to insure proper development standards when development begins.

- Flood control measures must be developed in the Escalante Valley.

- Mining and mineral development in the area should be encouraged.

- Fragmented parcels of public land should be made a part of adjacent urban development or otherwise disposed of for public or private use and development.

- o Development should be considered in terms of economic feasibility to the county.

- o Quality rather than quantity growth should be encouraged.

- o The county should not become an urban service county. It is not presently, nor should it attempt to become extensively involved in providing urban services to unincorporated areas, (Iron County, 1972).

As a part of the 1972 master plan study in Iron County, the land use patterns of each community were studied. The land use pattern in Cedar City was updated in the 1979 Cedar City master plan. Land use plans for communities that could be affected by the M-X project are discussed below.

Cedar City Land Use

Cedar City is the largest city in Iron County, in terms of both population and land area. The city presently encompasses almost 4,700 acres of land, however, over 40 percent of the land area in the city is still vacant and undeveloped (see Table 1.1.4-2). This amount of vacant land (approximately 1,900 acres) provides ample room for baseline growth for many years before additional annexations will become necessary. In addition (and currently in agricultural use) 770 acres can be converted to urban uses as conditions evolve. All residential uses presently occupy 663 acres of land which is equivalent to that devoted to streets and highways, 668 acres. About 7 percent of the land is devoted to commercial and industrial use and another 8 percent is in public, quasi-public, recreation and other public purposes. Figure 1.1.4-2 provides the land use element of the 1979 master plan.

Enoch Land Use

There are presently some 150 acres of land in the town of Enoch, and approximately 62 percent of this is currently vacant and available for development. Table 1.1.4-2 provides land use data and Figure 1.1.4-3 shows the 1972 master plan for Enoch.

In 1972 the Enoch water system was classified as unapproved by the Utah State Department of Health. At the time this meant that home construction loans in the area would not be eligible for federal financing. Therefore prior to substantial growth the water system needed improvement. At this time it has not been determined if the system has received state approval. Enoch has recently began to update its master plan and zoning ordinance. Work on these tasks will be taking place during early 1981.

Kanarraville Land Use

Kanarraville presently has some 14 acres of land developed for residential purposes or about 5 percent of the community total (Table 1.1.4-2). Other types of development include commercial development, religious facilities and public facilities, accounting for a little less than 1 percent of the total land area. Improved streets cover approximately 54 acres of land or about 19 percent of the land area of Kanarraville. There is still some 38-39 percent of the land devoted to agricultural purposes (Figure 1.1.4-4). The water system in Kanarraville, as in Enoch above, had not received state approval in 1972.

Table 1.1.4-2. Existing land use - Cedar City, Enoch, Kanarraville, Newcastle, Paragonah and Parowan, Utah.

LAND USE	CEDAR CITY		ENOCH		KANARRVILLE		NEW CASTLE		PARAGONAH		PAROWAN	
	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT
Single Family	569.5	12.1	7.6	4.8	12.8	4.5	9.2	3.3	30.0	10.1	124.6	5.2
Mobile Home	59.8	1.3	.9	.6	1.8	.6	1.0	.4	2.6	.9	9.3	.4
Multiple Family	33.9	.7	—	—	—	—	—	—	—	—	2.3	.1
Commercial	181.4	3.9	—	—	.9	.3	—	—	.8	.3	8.7	.4
Public	186.0	4.0	—	—	—	—	—	—	—	—	3.7	.2
Religious	40.5	.9	2.0	1.3	.6	.2	2.7	1.0	.9	.3	2.6	.1
School	—	—	—	—	—	—	.7	.2	2.0	.7	15.9	.7
Industrial	126.5	2.7	—	—	—	—	—	—	—	—	16.4	.7
Park and Cemetery	144.5	3.1	—	—	—	—	—	—	2.8	.9	27.7	1.2
Agriculture	769.6	16.4	39.4	24.9	110.5	38.7	63.9	22.6	77.6	26.2	246.8	10.4
Streets	668.7	14.2	10.1	6.4	53.9	18.9	49.2	17.4	70.1	23.7	117.3	4.9
Vacant	1,917.7	40.8	98.0	62.0	105.0	36.7	156.2	55.2	109.2	36.9	1,806.3	75.8
Total	4,698.1	100	158.0	100	285.8	100	282.9	100	296.1	100	2,381.6	100

3970

Sources: Cedar City, 1979; Five County Association, 1978.

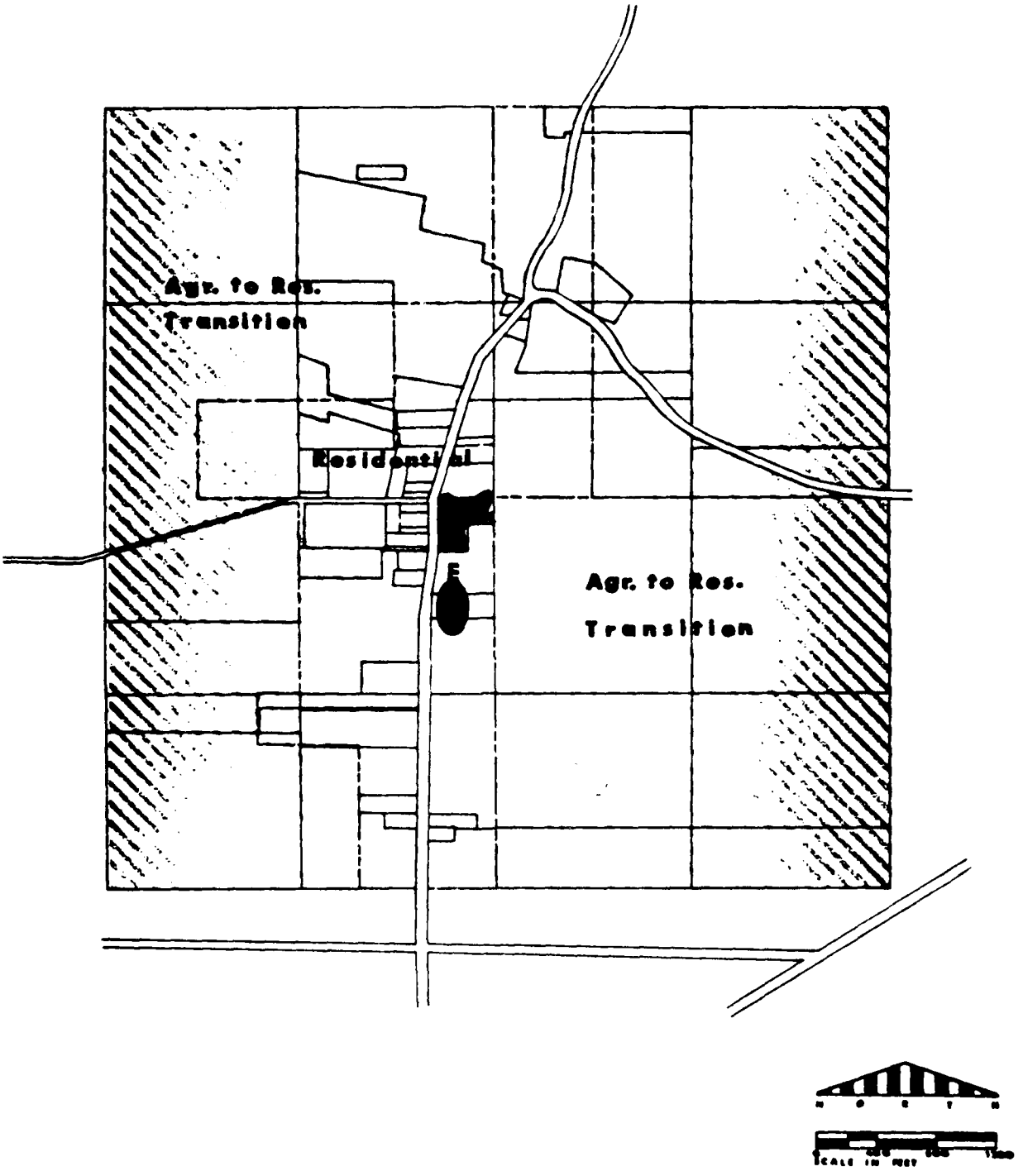

Figure 1.1.4-3. Master plan for Enoch, Utah (John C. Willie & Assoc., 1972).

2089-A

Figure 1.1.4-4. Master plan for Kanarraville, Utah (John C. Willie & Assoc., 1972).

2090-A

Newcastle Land Use

Newcastle is a community of approximately 283 acres, of which slightly over 50 percent is still vacant and available for future development (Figure 1.1.4-5). Agriculture consumes almost 23 percent of the community land, and another 17 percent is devoted to streets and street improvement. Only about 5 percent of the community has actually been developed for improvement purposes such as residential, commercial, public, religious, or school (Table 1.1.4-2). Of this amount, a little over 10 acres is utilized for residential purposes. There is approximately 4 times as much land presently devoted to street dedication as there is to residential development. This pattern is typical of many early pioneer communities laid out in the grid-iron pattern, and of course, as other residential growth comes to New Castle, this percentage will decrease. The water system in New Castle was on the State list of unapproved systems in 1972.

Paragonah Land Use

Just over 13 percent of the total land area of Paragonah has been devoted to urban development purposes. Agricultural land in Paragonah accounts for some 26 percent of the total land area, and streets take up nearly 24 percent of the town. Table 1.1.4-2 and Figure 1.1.4-6 show the existing land use data and master plan respectively for Paragonah.

Nearly 37 percent of the town of Paragonah is still vacant and could be used for future development purposes. The water system in Paragonah at the time of the 1972 master plan was approved to the extent that residents were eligible for federally - financed construction loans.

Parowan Land Use

Parowan is presently an incorporated third-class city in Iron County with approximately 2,400 acres of land. However, approximately 75 percent of this land area is currently vacant or unused for urban development (Table 1.1.4-2). Residential development of all types accounts for about 136 acres of land, or about 6 percent of the total land area of Parowan. With 1,800 acres of vacant land presently existing, there would appear to be more than adequate land within the existing community to accommodate baseline growth. Existing land use in Parowan is shown in Figure 1.1.4-7.

Zoning

Iron County has a zoning ordinance and a subdivision ordinance which was adopted in 1961. The present ordinance has been beneficial over the years in protecting the health, safety and general welfare of the county residents. A large portion of the county is zoned in an outlying zone. This zone requires no conditions for approval and any type of land use may be located anywhere in the zone, and under any conditions.

The subdivision ordinance has been rewritten since the adoption of the Master Plan and has been revised since then. If followed in light of the policies of the Master Plan, it will give adequate protection to the county when new subdivision plots are proposed and approved.

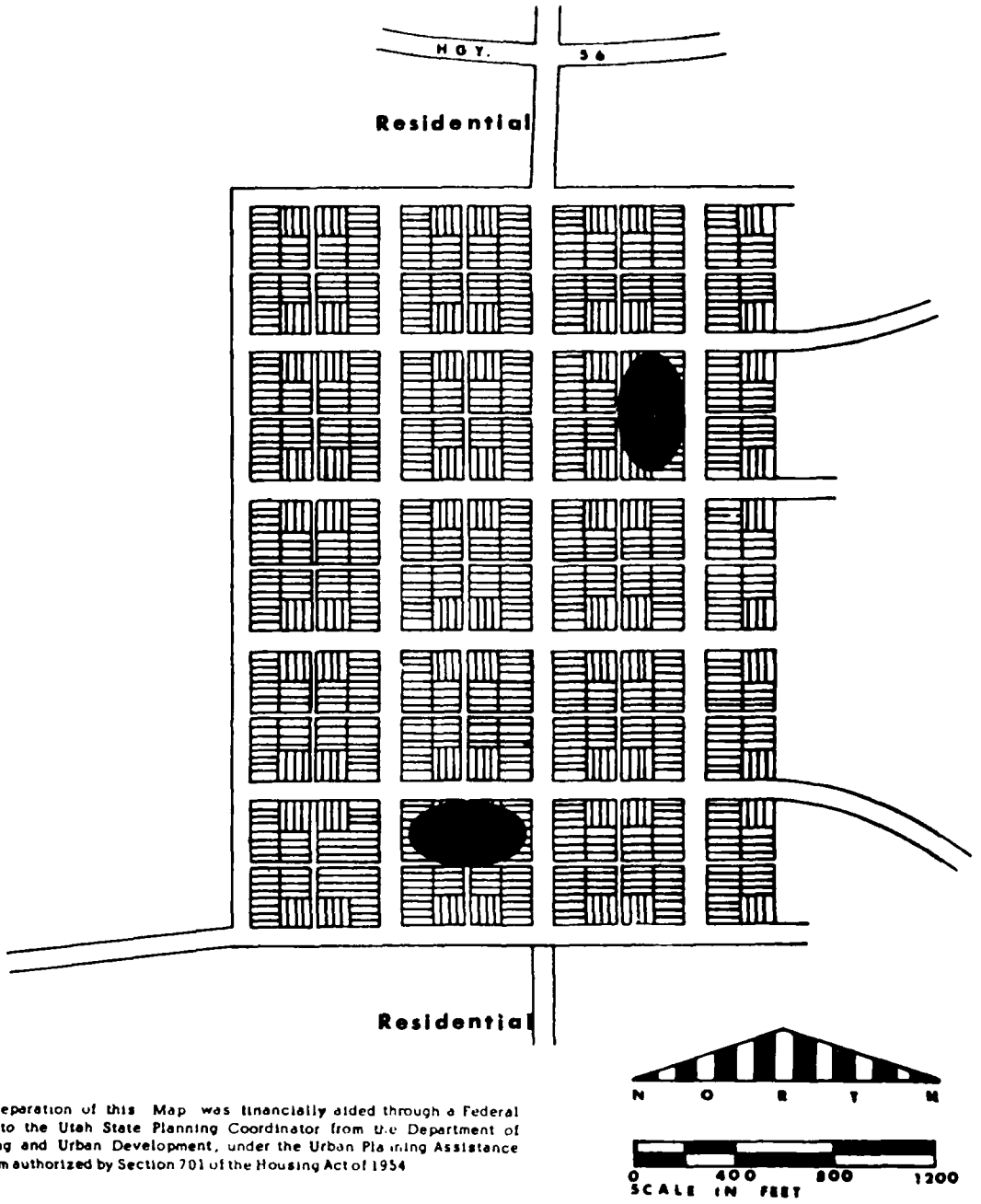

Figure 1.1.4-5. Master plan for Newcastle, Utah (John C. Willie & Assoc., 1972).

2074-A

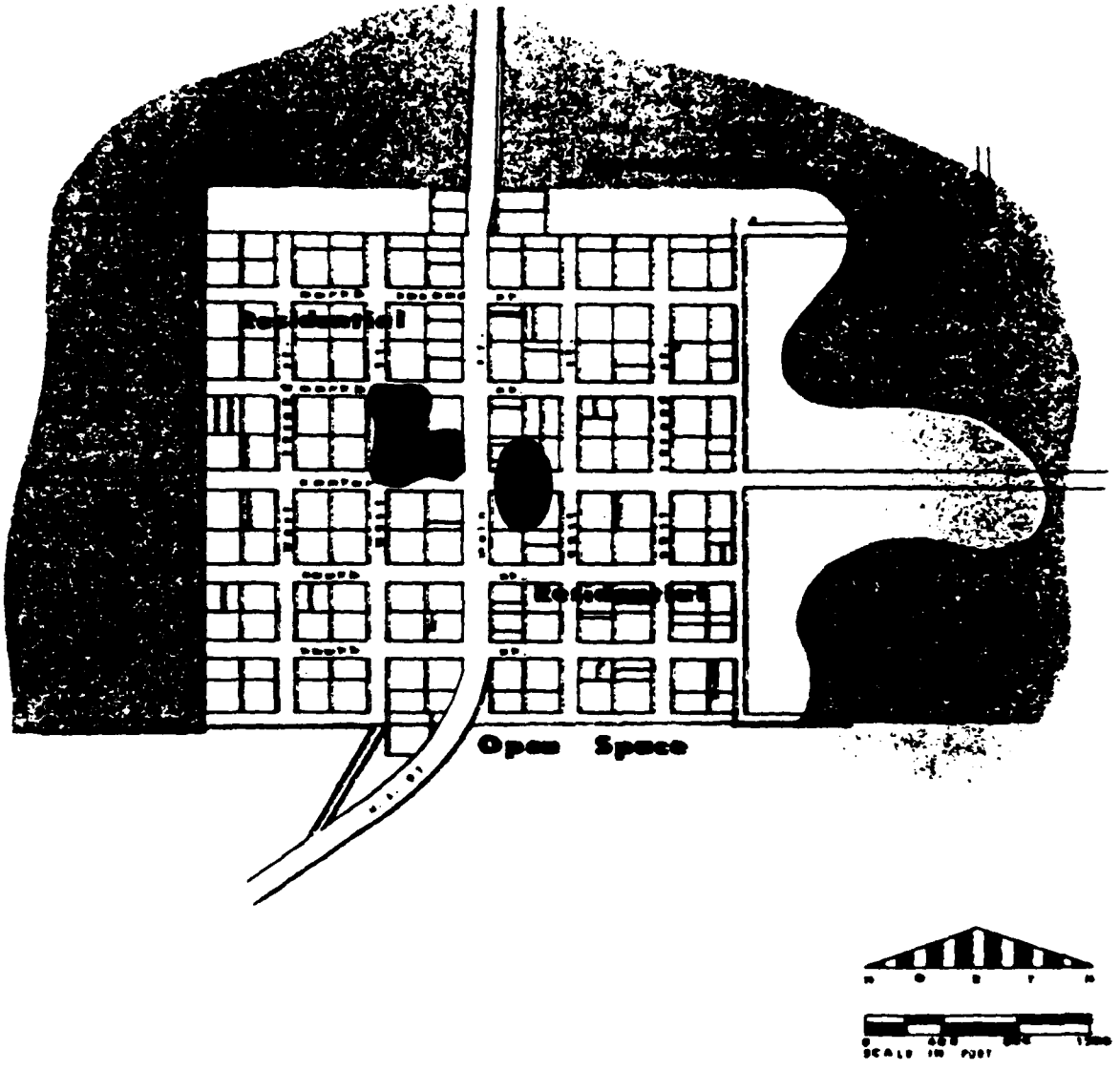

Figure 1.1.4-6. Master plan for Paragonah, Utah (John C. Willie & Assoc., 1972).

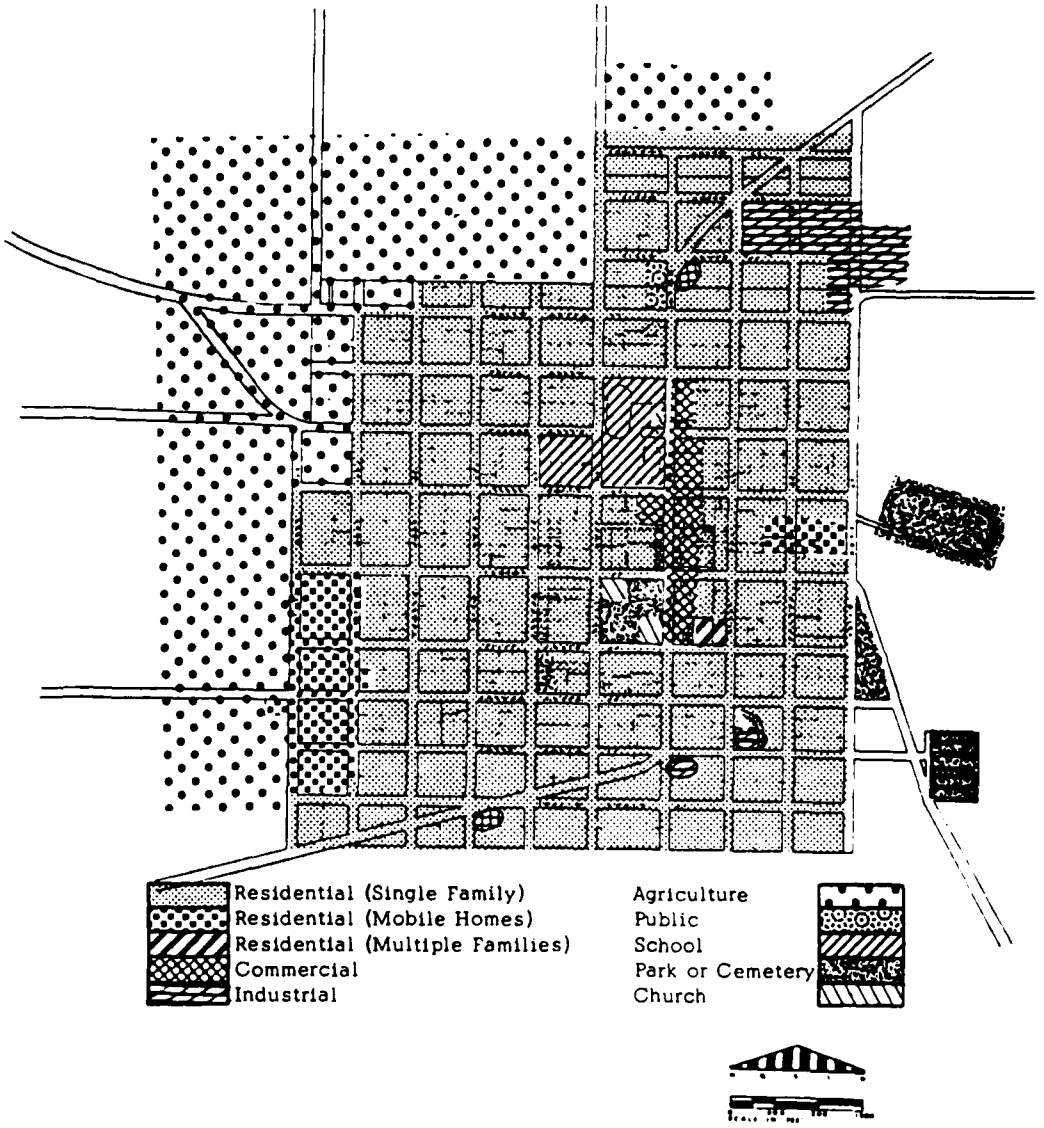

Figure 1.1.4-7. Land use in Parowan, Utah (John C. Willie & Assoc., 1972, Iron County Land Use Report).

2076-A

Rural Land Use

Iron County comprises about 2,112,000 acres, of which 974,080 acres (46 percent) is rangeland managed by the Bureau of Land Management. Critical areas of concern within 50-70 mi of Beryl include the Dixie National Forest, Zion National Park, and State Wildlife Management Area at Indian Park.

Agriculture

About 150 acres of irrigated cropland are located southeast of Beryl midway between Beryl amd Beryl Junction in Iron County. The area proximate to Beryl, Utah, is used mainly for grazing. Beryl lies in the Pinyon Planning Unit where the Bureau of Land Management permits 14.4 acres per AUM for a total grazing authorization or 87,373 AUMs.

Recreation

The region surrounding Beryl contains fishing or concentrated recreation sites. Most of the land south of Beryl is privately owned and, as such, is not subject to any dispersed recreation activities.

Mining

Active mines and mills, as well as adjoining groups of patented claims still relatively undeveloped, are indicative of explored, surveyed, and sampled concentrations of mineralized land with high potential. Certain high wildcat potential areas of closely grouped oil leases should also be considered for tentative exclusion, depending on the outcome of deep tests currently being drilled. Oil/gas leases are widely scattered in the Beryl/Escalante area.

Beryl has sporadic mining activity of gold and silver in the ranges to the north and west. Pegmatitic veins in the granite rock have been found rich in beryllium, a strategic metal. The town derives its name from beryl, the parent mineral. The ore is sent for processing to the beryllium extraction plant at Delta.

LAND OWNERSHIP (1.1.5)

Within a five mi radius of the center of Beryl, 68 percent of the land is privately held, 8 percent is state land, and only 24 percent is federally owned. The bulk of the latter, however, is located two to three mi northwest of Beryl.

HOUSING (1.1.6)

Iron County experienced moderate growth in housing over the past two decades. From 1960 to 1970 the county grew at an average rate of 1.2 percent, adding 400 housing units to each 3,620 units by 1970. In the next six years, housing growth picked up to a 3.7 average annual growth rate and the county's housing stock reached 4,500 units in 1976. The proportion of the county's housing stock in single-family units declined from 71.5 percent in 1970 to 69.8 percent in 1976, while the share of multi-family units and mobile homes increased from 28.5 to 30.2 percent in the same period.

It is estimated from annual construction permits authorizing residential construction that an average of 145 conventional housing units were added each year from 1970 to 1979, with a maximum yearly output of 306 units in 1978. In 1976, mobile homes constituted an estimated 10 percent of the housing in Iron County, totaling some 450 units. In 1970, 70.5 percent of the housing units were owner-occupied. In the same year, nearly 70 percent of Iron County's housing was located in one community, Cedar City.

COMMUNITY INFRASTRUCTURE (1.1.7)

Iron County is relatively sparsely populated, and would be expected to have a minimally developed infrastructure. Small communities such as Beryl or Modena would provide virtually no public services for area residents. Instead, infrastructure would be concentrated in Cedar City or dispersed throughout the county.

Organization

County government in Utah is headed by three elected county commissioners; two serving 4-year terms and one commissioner serving a 2-year term. Other elected county officials include a sheriff, clerk, recorder, assessor, treasurer, and county attorney. Beryl, an incorporated city, is under the jurisdiction of the County Commissioner.

Incorporated cities in Iron County include Paragonah, Parowan, Enoch, Cedar City, Kanarraville and Brian Head. Parowan is the county seat, while Cedar City is the principal city in the county containing almost 90 percent of the population.

Principal governmental entities in addition to the county officials listed above include the mayor and city councils in the larger communities, and town board presidents and board members in the smaller communities. Iron County also has benefit of an organized County Housing Authority, created primarily to provide housing and personal care for migrant farm workers in the Beryl crossroads farm area of the county.

Education

During the 1978-1979 school year, Iron County experienced a total enrollment of 4,052 pupils. Currently, the enrollment level is 4,052 pupils, and a total of 191 teachers are employed in the county (Table 1.1.7-1). Total enrollments are distributed over six elementary schools with a combined total enrollment of 2,450 pupils, and three junior/senior high schools with an enrollment of 1,602 pupils. Capacity has been filled in all the schools with only limited excess space available in Cedar High School. Projected enrollments for 1980-1981 call for additional students and plans to construct a new elementary school are in the process. The community has recently passed a school bond to support this development.

Health Care

The Valley View Medical Center in Cedar City is a relatively new hospital, constructed in the middle 1960's. It holds 72 beds, representing a ratio of 5.6 beds per 1,000 population in 1977. Health care is also provided through four private medical clinics. Cedar City is served by approximately 15 physicians, 10 dentists, 25 RN's, 10 LPN's, and 2 mental health workers, as well as an optometrist and other health

Table 1.1.7-1. Summary of educational statistics for study area locations.

COUNTY	ENROLLMENTS	EXCESS CAPACITY	TEACHERS	PUPIL TEACHER RATIO	FUTURE PLANS
White Pine[1]	1,662	1,060	91	18.3	Not available
Clark[1]	86,479 (1979)	Very little	3,730	23.1	Development occurring
Iron[1]	4,052	40	191	21.2	School bond passed to build new elementary school
Beaver[3]	1,026	650	53	19.4	Not available
Millard[4]	2,176	134	88	24.7	Remodeling occurring
Dallam[5]	1,600	100	102	15.7	Available land for future expansion
Curry[6]	7,850	1,875	417	18.8	Expansion of classrooms in all levels is planned
Lincoln[7]	911	170	54	16.9	Not available

1347-2

[1]Nevada Department of Education, 1979-80. Enrollment and Certified Personnel Information. Vol. 22. Research Bulletin. Nevada Department of Education.

[2]Iron County School District, 20 May 1980. C. Morris, School Superintendent. Telephone Communication.

[3]Beaver County School District, 20 May 1980. L. Haslam, School Superintendent. Telephone Communication.

[4]Millard County School District, 20 May 1980. Ken Topham, School Superintendent. Telephone Communication.

[5]Dalhart Independent School District, 22 May 1980. D. Williams, School Superintendent. Telephone Communication.

[6]Cannon Air Force Base Environmental Coordinator, 1975. Tab A-1. Environmental Narrative. Clovis, New Mexico.

[7]U.S. Department of the Interior (BLM), Social-Economic Profile, Lincoln County, July 1976.

care specialists. The city also maintains an ambulance. Present utilization rate at the hospital is less than 50 percent as shown in Table 1.1.7-2.

Police Protection

The police department in Cedar City employs 15 full-time officers and the city contracts with the state highway patrol for use of the patrol's radio services at the patrol office in Cedar City. Police maintain contact with the highway patrol and sheriff by telephone and car radio (see Table 1.1.7-3).

Fire Protection

The Cedar City fire department is comprised of 3 full-time and 32 volunteer firemen. The city earns a fire insurance rating of "5" on a 10-point national scale. Presently the fire department operates out of one main station with the exception of the crash truck which serves the airport. The major equipment consists of two 1,250-gallon pumpers; two 750-gallon pumpers; two brush trucks; and one snorkel truck. There are also two personal cars being used by fire officials (see Table 1.1.7-4).

Water Supply And Distribution

Cedar City acquires its water from six wells and 14 springs. Capacity is 7.6 mgd while present use is 6.7 mgd. The city has purchased rights to surface water from Coal Creek, and annual rights to 2,000 acre-ft from Kolab Reservoir. Surface or reservoir water is not suitable for culinary use without treatment.

Peak-period water rights for Cedar City total 7,723 gpm, and are substantially greater than the 1979 peak-day demand of 4,657 gpm. Physical facilities are only able to pump 5,309 gpm from the springs and wells, 14 percent more than the 1979 peak demand. Should any of the wells serving culinary demand be taken out of service, peak demand may not be met.

Wastewater Collection And Treatment

The wastewater collection system in Cedar City was constructed in the 1930s and has expanded to meet growth requirements. This system is in good condition and does not experience inflow or infiltration problems. Average daily flow is 100 gpcd.

The plant was designed for a population equivalent of 19,000 persons, or 2.26 mgd. Performance is less than desirable. The present flow rate is estimated to be 1.8 mgd.

Solid Waste

Cedar City's 20 acre waste disposal site of which 5 acres are being used, where most waste material is deposited, is located about 3 mi southwest of the center of the city. Presently, five acres are being used. The cost of maintaining this site is absorbed by the city, which also maintains a mandatory garbage pickup service.

Table 3.3.7-2. Health services and facilities in study area locations.

[illegible] COMMUNITY	HOSPITAL FACILITIES	PHYSICIANS	RN'S AND LPN'S	DENTISTS	MENTAL HEALTH WORKERS	COMMENTS
[illegible]	44 Acute 90 Skilled Nursing	4	39 RN 10 LPN 86 Aids	4	6	Nursing home under construction, 99 bed capacity
[illegible] Las Vegas Area	1,728 Acute 919 Long Term	508	1,112 RN 594 LPN	163	N A	
Iron County Beryl and Vicinity[1]	23 Acute	15	35 Nurses	10	2	Community has excess capacity in hospital. Present utilization rate is less than 50 percent.
Beaver County Minersville and Vicinity[2]	12 Acute 20 Long Term	1	6 RN 2 LPN	1 Part-time	0	
Millard County Delta and Vicinity[3]	18 Acute 18 Long Term	5	7 RN 6 LPN	4	2	
Dallam and Hartley Counties Dalhart and Vicinity[4]	67 Acute 80 Long Term	5	10 RN 20 LVN	4	N A	Expansion plans are in process to double the number of doctors and hospital beds in area.
[illegible] and Vicinity[5]	106 Acute 100 beds at Cannon AFB	22	110 Nurses	18	12	Hospital utilized at 65 percent.
Lincoln County Panaca, Pioche, Caliente and Vicinity[6]	10 Acute 9 Skilled Nursing	2	6 RN	1	N/A	

1348-2

[1] Nevada Bureau of Business and Economic Research, July 1977. Socioeconomic Analysis of the White Pine Power Project. Reno, Nevada.

[2] Clark County Health District, 6 June 1980- A. Dague, Health Planner, Telephone Communication.

[3] Bureau of Economic and Business Research, 1979. Community Economic Facts—Cedar City.

[4] Milford Valley Memorial Hospital, 6 June 1980. J. Williams, Director of Nursing, Telephone Communication.

[5] Architects-Planners Alliance, Inc., 1979. Socioeconomic Analysis—Lynndyl Alternative Site, Salt Lake City.

[6] Dalhart Hospital, 6 June 1980. A. Peterson, Director of Nursing, Telephone Communication.

[7] Texas High Plains Hospital, 6 June 1980. S. Grigsby, Director of Nursing, Telephone Communication.

[8] U.S. Department of Interior (BLM), Social Economic Profile, Lincoln County, July 1976

Table 1.1.7-3. Police protection characteristics in study area locations.

COUNTY/COMMUNITY	POLICE OFFICERS	SHERIFF	HIGHWAY PATROL
White Pine County[1] Ely and vicinity	14	15	3
Clark County[2] Coyote Springs area	738	Serves Area	Serves Area
Iron County[3] Beryl and vicinity	15	Serves Area	Serves Area
Beaver County[4] Milford and vicinity	2	Serves Area	Serves Area
Millard County[5] Delta and vicinity	3	4	6
Dallam/Hartley Counties[6] Dalhart and Vicinity	7 (Dallam) 0 (Hartley)	14 (Dallam) 2 (Hartley)	4 (Dallam) 0 (Hartley)
Curry County[7] Clovis and Vicinity	72	Serves Area	Serves Area
Lincoln County[8] Panaca, Pioche, Caliente	6	7	1

1349-1

[1]White Pine County Sheriff's Department, 5 June, 1980 M. Burns, Deputy, telephone conversation.

[2]Las Vegas Police Department, 5 June 1980. Officer Bottomly, Personnel Officer, telephone conversation.

[3]Bureau of Economic and Business Research, 1979, Community Economic Facts—Cedar City.

[4]Five County Association of Governments, 1976, *Planning for Growth in Beaver County*, Beaver County Planning and Development Agency.

[5]Architects/Planners Alliance Inc. 1979. Socioeconomic Analysis—Lynndyl Alternative Site, Salt Lake City.

[6]Panhandle Regional Planning Commission, 22 May 1980. M. Kenderdine, Planner, telephone conversation.

[7]Clovis Police Department, 5 June 1980, Y. Garcia, Secretary I, telephone conversation.

[8]U.S. Department of Interior(BLM), Social-Economic Profile, Lincoln County, July 1976.

Table 1.1.7-4. Fire protection characteristics in study area locations.

COUNTY COMMUNITY	FULLTIME FIRE DEPARTMENT	VOLUNTEER FIRE DEPARTMENT	FIRE INSURANCE RATING	COMMENTS (EQUIPMENT, ETC.)
White Pine County, Ely[1]	5 Paid Staff	45 Volunteers	5	Rescue mini pumper, 250 gallon capacity 1300 gallon/minute pumper, 1000 gallon capacity 1350 gallon/minute 1 GPC tank/pumper combination 650 gallon/minute La France, 240 gallon capacity 350 gallon/minute La France, 240 gallon capacity 750 gallon/minute pumper, 500 gallon capacity 1500 gallon/minute Walter Foam Truck
Clark County, Las Vegas[2]	254 Fire Fighters	-	3 (will move into "2" rating soon)	9 Fire trucks and 2 snorkler trucks.
Iron County, Cedar City[3]	3 paid staff	32 Volunteers	5	4 pumper trucks (1,250 and 750 gallon) 2 brush trucks 1 crash truck at airport 1 snorkle truck Several ambulances
Beaver County, Milford[4]	-	High School Students act as Volunteer Fireman	7	Several pumper trucks
Millard County, Delta[5]	-	25 Volunteer	7	3 pumper trucks (500, 750, and 1,000 gallon)
Fillmore	-	30 Volunteers	7	3 pumper truck (500, 750, and 250 gallon)
Dallam and Hartley Dalhart[6]	1 paid staff	20 Volunteers	2(C Key Rating Range from 1(C (excellent) to $1,00 (poor)	Two 1,500 gallon pumper trucks One 250 gallon mini pumper One back-up pumper (old) Five 4-Wheel drive vehicles
Curry County Clovis	75 Fireman (EMT[a] trained)		6 (will move into a "4" soon)	Eight 1,500 gallon pumpers Two snorkle units One crash truck and several ambulances
Lincoln County[b] Panaca, Pioche, Caliente	-	55-60 Volunteers	7 Pioche, Caliente 8 Panaca	One 250-gallon pumper Four 500 gallon pumpers One 450 gallon pumper Two 125-gallon skip-a-pumps

[a] Fire Department, 5 June 1980, E. Ritchie, Dispatcher, telephone conversation.

[2] Las Vegas Fire Department, 2 June 1980, S. Hardcastle, Chief Secretary, telephone conversation.

[3] Cedar City Fire Department, 6 June 1980, C. Nielson, Fire Marshall, telephone conversation.

[4] Iron County Association of Government , 1976, Planning for growth in Beaver County, Beaver County Planning and Development Council.

[5] Architect-Planners Alliance Inc., 1979, Socio-economic Analysis Expanded Alternative Site, Salt Lake City.

[6] Dalhart Fire Department, 10 June 1980, M. Stipe, Fire Chief, telephone conversation.

[7] Clovis Fire Department, 10 June 1980, L. Carter, Fire Chief, telephone conversation.

[8] U.S. Department of Interior (BLM), Social Economic Profile, Lincoln County, July 1976.

Parks And Recreation

Cedar City contains a wide variety of recreational facilities including an auditorium, swimming pool, park and playgrounds, a nine-hole golf course, baseball fields, clubs, lodges, moving picture theaters, a municipal library, a 12-lane bowling alley, a race track and rodeo grounds. Picnicking and camping facilities have been provided in the nearby canyons and forest picnic areas. Winter sports, particularly skiing areas, have been developed in the mountainous areas to the east.

QUALITY OF LIFE (1.1.8)

An understanding of the present quality of life in Iron County is important in order to discuss future possible impacts from M-X deployment. To develop this understanding, different sources will be integrated to describe the current social and economic situation. These sources include quality of life indicators of population, education, housing, economic growth, etc. (Table 1.1.8-1).

Iron County had a total population of 15,000 persons in 1977, with the majority located within Cedar City. In 1970, 73.5 percent of the residents in Iron County lived in Cedar City. As a result, the population density of Iron County is sparse outside this community, although its density was 4.7/mi^2 county wide in 1977, reflecting a higher density level than most areas in Utah. Between 1960-1970, the average annual growth rate was 3.5 percent, which is higher than the Utah mean of 2.5 percent. The major portion of this increase occurred in Cedar City, while the population in the remainder of Iron County actually decreased. The median age in Iron County is somewhat lower than the state median age because of the enrollment at Southern Utah State College in Cedar City. Although 98 percent of the population was white, approximately 12 percent of Beryl-Newcastle division residents were listed as non-whites, suggesting some degree of ethnic diversity in the base study area.

The median housing value in Iron County was $16,687 in 1970, compared to $17,057 for the Utah State mean. In general, the housing situation seems relatively good, with many houses for sale and the ability to handle more expansion in housing demand (Alunite Final Environmental Statement). There was 70.5 percent owner-occupancy of the housing market with a high level of mobile homes at 8.4 percent, and a higher than average number of rental units. The Utah state mean level of mobile homes was only 2.7 percent.

Iron County's economy is dominated by trade, state and local government, and services as it is an important recreational center. The fastest growing sectors are finance, insurance and real estate, which have grown 23 percent annually since 1969. The civilian labor force growth rate (1970-1977) was 5.8 percent higher than other study areas and somewhat similar to the Utah mean of 5.6 percent. The unemployment rate of 6.2 is slightly above the Utah mean of 5.3 during 1977. Only 13.3 percent of the population was receiving public assistance in 1976, as compared to a Utah mean of 14.7 percent. During 1977 the per capita income of Iron County was $4,693, approximately 78 percent of the Utah mean level of $5,943.

In general, people residing in Iron County tend to be quite satisfied with their communities, mentioning such advantages as access to out-of-doors; good place to raise family, friendliness of people, and absence of polluted environment. Disadvantages included the lack of jobs for young people, lack of good shopping centers, lack of cultural refinement, and lack of opportunities for earning a livable income.

Table 1.1.8-1. Quality of life indicators, Iron County.

	WHITE PINE CO. (ELY)	CLARK CO. (KANE SPRINGS)	IRON CO. (BERYL)	BEAVER CO. (MILFORD)	MILLARD CO. (DELTA)	CURRY CO. (CLOVIS)	DALLAM CO. (DALHART)	HARTLEY CO. (DALHART)
Population								
Annual Rate [illegible]	- 2	4.0	2.9	1.6	2.5	2.0	1.7	1.6
[illegible]	9	45.7	4.4	1.7	1.2	31.0	4.4	2.0
Housing								
Percent of Dwelling Units Owner Occupied	72.8	58.3	70.5	82.5	85.5	59.4	65.6	69.2
Percent of Housing Units with More than 1.0 Persons/Room	11.6	8.9	9.5	8.1	10.3	10.5	8.6	11.5
Median Number of Dollars as Percent of Housing Costs	12.2	11.7	8.4	4.1	2.8	NA	NA	NA
Median Home Value	23,849	23,142	16,487	12,381	10,519	13,025	7,358	16,919
Economics								
Civilian Labor Force Growth Rate	- 4	6.3	3.8	4.1	3.3	1.1	5.3	13.9
Unemployment Rate	7.8	8.1	6.2	7.0	4.7	4.3	4.5	2.1
Per Capita Income	3,368	7,715	4,693	5,114	3,978	3,687	3,866	4,611
Proportion of Population on Public Assistance	15.6	15.5	13.3	18.1	20.7	17.6	20.4	7.4
Health								
Physicians 1,000 Population (1976)	0.3	1.2	0.7	1.0	0.6	0.7	0.6	0.0
Dentists 1,000 Population (1976)	0.3	0.4	1.3	0.4	0.3	0.5	.3	.3
Registered Nurses 1,000 Population (1976)	3.1	3.2	3.8	5.0	2.5	4.2	5.4	5.4
Hospital Beds 1,000 Population (1976)	4.4	4.7	3.6	5.6	4.5	3.0	6.9	0.0
Crime Rates								
Police Officers 1,000 Population (1976)	2.8	3.4	1.8	1.0	1.1	2.0	NA	NA
Fireman 1,000 Population	NA	NA	NA	NA	NA	NA	NA	NA
Violent Crimes 1,000 Population (1976)	4.8	9.6	1.5	1.5	1.5	2.3	1.4	1.4
Crimes Against Property 1,000 Population (1976)	34.5	84.9	21.1	21.1	21.1	15.4	14.8	14.8
Social Disorganization								
Divorce Rates 1,000 Population (1975)	11.2	18.6	3.5	3.7	1.7	6.3	6.9	4.7
Suicide Rate 1,000 Population (1976)	60.0	23.3	3.0	9.4	9.4	18.3	11.9	11.9
Alcoholism Rate 1,000 Population (1976)	38.3	46.0	22.8	22.8	19.3	18.1	19.2	19.2
Education								
Median School Year Completed (1976)	12.1	12.4	12.8	12.3	12.4	12.2	11.3	12.4
Pupil Teacher Ratio	21.2	25.0	24.8	21.2	23.4	22.3	15.7	15.7

845B-1

[1]U.S. Dept. of Commerce, Statistics. *Abstract of the United States*, 1978.

[illegible] Nevada Dept. of Education, 1979. *Research Bulletin*, Vol. 21, No. 1

[3]Utah Superintendent of Public Instruction, 1978. *Annual Report of the State Superintendent*.

[4]Nevada Office of Planning Coordination, 1978. *Nevada Statistical Abstract*.

[5]Utah Bureau of Economic and Business Research, *Statistical Abstract of Utah*, 1979.

[6]DeChiara, J. and L. Koppelman, 1975. *Urban Planning and Design Criteria*, New York, Litton Educational Publishing, Inc.

[7]Architects Planners Alliance, Inc., 1979. "Socioeconomic Analysis-Lynndyl Alternative Site." Intermountain Power Project.

[8]Four Corners Regional Commission, 1979. *Six County Development Plan*.

[9]U.S. Dept. of Commerce, 1979. *Bureau of Economic Analysis Computer Printouts*.

[10]Duchon, J. et al., 1979. *Environmental Impact Data Book*.

[11]U.S. Bureau of the Census, 1977. *City and County Data Book, 1978*.

[12]Nevada Office of Health Planning and Resources, 1977. *Nevada State Plan for Health*.

[13]United States Dept. of Justice, 1978. *Uniform Crime Rates for the United States--1977*. U.S. GPO, 1978.

[14]U.S. Bureau of the Census, 1972. *County and City Data Book, 1972*.

In 1976, citizen committees were organized to prioritize community problems (Five County Development Plan). Ranked as the number one problem area was unemployment/underemployment, followed by inadequate income, family conflicts, crime/delinquency, child abuse and neglect, and drug/alcohol abuse.

A review of Iron County's public services and related social characteristics describes a somewhat variable situation. Health services on the whole are low to adequate, with 0.7 physicians/1,000 population; 1.0 dentists/1,000; 2.8 registered nurses/1,000 population; and 3.6 hospital beds/1,000 population. These levels compare to the Utah State mean levels of 1.4, 0.7, 4.8, and 3.1, respectively.

Public safety indicators show only 1.8 law enforcement personnel per 1,000 in Iron County, compared to a ratio of 2.3 for the State. This level is similar, though, to other study area counties. Social disorganization indicators which include divorce, suicide and alcoholism rates describe a relatively stable community structure existing in Iron County. The divorce rate was 3.5/1,000 population and the suicide was 15/100,000 population during 1977 in District 5, which includes Iron County. This compares to Utah State means of 5.1 and 13.0, respectively for these statistics. The numbers of reported violent crimes and crimes against property were about average with other Utah study area counties.

One outstanding feature of Iron County is the presence of Zion National Park and Dixie National Forest, which are within close proximity to Cedar City. Also located within Cedar City are a swimming pool, tennis courts, theater, golf course, and other community recreational facilities. The residents of this area are able to enjoy these major recreational sites. The availability of these facilities add to the beneficial aspects of living in Iron County.

ENERGY (1.1.9)

Beryl has no natural gas service. Service could be extended into the area by Mountain Fuel Supply (MFS) in Salt Lake City, but there are presently no plans for such expansion. Pacific Gas Transmission (PGT), a subsidiary of Pacific Gas and Electric in San Francisco, has proposed to build a 30-in high-pressure gas transmission line from Kemmerer, Wyoming, and Bonanza, Utah, joining east of Provo, Utah, near Strawberry Reservoir, continuing along Interstate 15 through Cedar City. This line will have sufficient capacity to transport natural gas to Beryl, which is approximately 20 mi west of the proposed pipeline route.

Home energy requirements in Beryl are supplied by bottled gas, fuel, oil, and electricity. The fuels are trucked from bulk fuel handling terminals in Las Vegas and Salt Lake City to regional distribution centers in St. George and Cedar City.

Electrical energy is supplied by Dixie-Escalante Rural Electric Association, Inc., which has a peak system demand of approximately 20 MW. The utility purchases its power from the Western Area Power Administration and the Department of Energy. Beryl is served by a 12.5 V rural distribution line.

TRAFFIC AND TRANSPORTATION (1.1.10)

The proposed base site at Beryl is in an undeveloped area in southern Utah. Primary access is via a 12 mi long paved road, which runs north from the

intersection of State Highway 56. An unpaved road also passes through the area connecting Milford, approximately 50 mi northeast of Beryl, with Modena, 15 mi to the southwest of Beryl. A schematic map of the road network including 1978 traffic volumes in the vicinity is shown in Figure 1.1.10-1.

The existing road between Beryl and Beryl Junction is a very low volume county road for which no current traffic data was available. State Highway 56 is a good quality two-lane road with average daily traffic of 460 near Beryl Junction. Cedar City is 43 mi to the east along this route. State Highway 18 is a good quality two-lane road, which passes through St. George 60 mi to the south. There are two small rural towns near Beryl Junction, Newcastle, and Enterprise, which lie on State Highway 56 and 18 respectively. There are a number of small communities west of the proposed site along State Highway 56. These include Pioche, Panaca, and Caliente.

NATIVE AMERICANS (1.1.11)

Community Environment Native Americans

Native American cultural resource information for the Beryl Enterprise District is limited. The Escalante Desert basin is surrounded by mountainous regions with abundant natural resources. Although only 6 historic aboriginal habitation sites have been inventoried, the area contains 55 springs around which additional cultural remains are predicted. The area north of the proposed base site, namely the southern portion of the Needle and Wah Wah ranges, is the ancestral territory of the Indian Peak Southern Paiute band. The highlands region south of the proposed site was occupied by the Tonoquints and Kumoits bands of Southern Paiutes (Inter-Tribal Council of Nevada, 1976). Both areas contain pinyon groves which are culturally significant to contemporary Native Americans. Additional site-specific data are anticipated from field studies underway at the Cedar City Indian Colony.

There are five bands of Southern Paiutes living in southern Utah, three of which are in the Beryl vicinity and two of which are about 100 mi away. In 1954, these bands, Indian Peaks, Shivwits, Cedar City, Kanosh, and Koosharem, which make up the Nuwuvi tribe, were terminated from federal trusteeship and, unable to pay their land taxes, subsequently lost most of their land. As of April 3, 1980, the bands have been restored to federal trusteeship and the law provides that (a) reservation lands now be restored to the extent possible, (b) that up to 15,000 acres be acquired in addition to the 26,880 acres retained by the Shivwits band and the 80 acres of original reservation lands retained by the Kanosh, and (c) enrollment is open to qualified persons.

Indian Peaks

The Indian Peaks reservation was created in 1915 and consisted of 9,000 acres at Indian Peak in Beaver County, about 25 mi north of Beryl. The land was purchased by the state of Utah shortly after termination and is now a Game Management Area. Because of its use as a GMA, the lands remain intact and are under consideration for reservation restoration. Following termination most of the IP band which has 30 enrolled members, went to live in Cedar City, 40 mi southeast of Beryl.

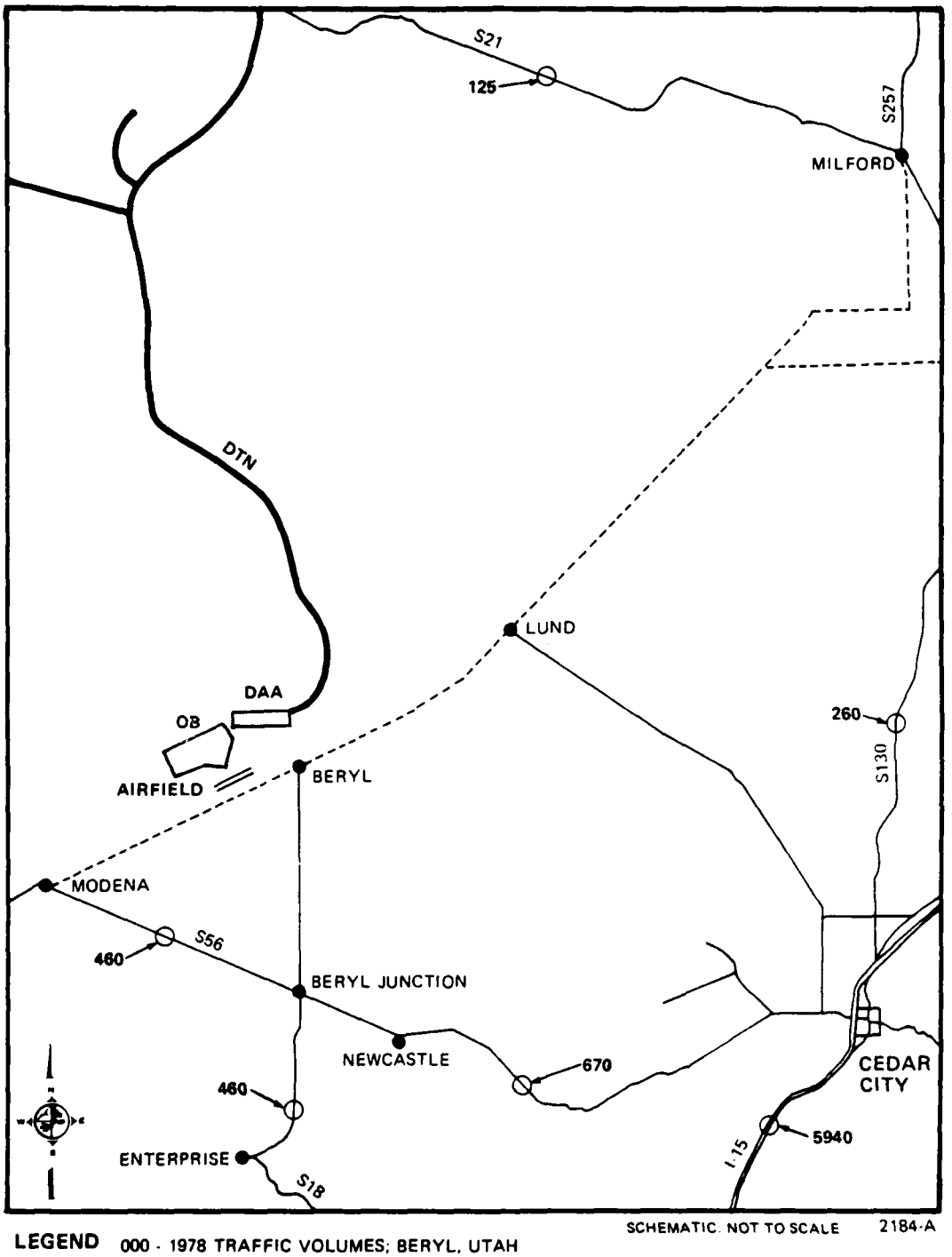

Figure 1.1.10-1. Existing traffic volumes in the vicinity of Beryl.

Cedar City

Cedar City Colony has 100 members, 75 of whom live in Cedar City, either at the colony itself or in houses in town which have been purchased by the CC Tribal Housing Authority. Thirty-six acres of the Cedar City Colony land is owned by the Mormon Church, the remaining five acres are tribally owned. Monies were appropriated by Congress in 1899 to buy land for Cedar City reservation lands, but the land was never bought. Following reinstatement, however, a reservation will be created. Since the Cedar City band currently resides in Iron County, reservation lands are expected to be withdrawn from that county.

The Shivwits band of Southern Paiutes is three times larger than any of the other bands, having an enrolled population of 290. The reservation lands, set aside in 1937, are located 50 mi south of Beryl and consist of 26,880 acres in Washington County. The Shivwits band was able to retain its land and pay the taxes on it by leasing parcels of it. Unlike the other Southern Paiute Utah bands, the Shivits reservation land is intact and Indian-owned. The band procured HUD money in 1977 and built 12 homes on the land, housing about 50 of the 290 enrolled band members. Most of the other Shivwits Southern Paiutes live in or near St. George while others live in Cedar City.

The Koosharem reservation in northern Paiute and south Sevier counties consisted of 900 acres, all of which is now privately owned by non-Indians. The Koosharem band has 65 members, about 50 of whom live in the town of Richfield, 110 mi NW of Beryl. There is a one acre Utah state reservation at Richfield but this is an industrial center and is not used for residential purposes. The Koosharem band lives in the town of Richfield proper. Since the Koosharem reservation lands are now privately owned, it is not expected that the same lands will be restored but land is expected to be withdrawn from Sevier County for reservation restoration.

The Kanosh band of Southern Paiutes had an 8,000 acre reservation set aside in 1929. The land is outside the town of Kanosh in Millard County about 95 mi NE of Beryl. All but 65 acres of this is now non-Indian owned. The 65 acres is the site of the Kanosh Colony, where about 40 of the 60 enrolled members live, and is expected to be taken back into trust. Other lands in the area are expected to be withdrawn for reservation lands.

Following termination from federal trusteeship, very little official attention was given to the Utah Southern Paiutes, consequently there has been no systematic data collection for the past 25 years and there is no reliable baseline data. Site-specific information on the socioeconomic environment of the Indian Peak, Kanosh, Koosharem, Shivwitz and Cedar City bands of the Utah Souther Paiutes is currently being collected by a field research team.

Operating Base And Vicinity Native Americans

The Beryl OB site is located at the confluence of three historic Southern Paiute band territories: the Tonoquints, Kumoits, and Indian Peak. There are no Indian reserves near the Beryl OB site. Direct descendents of these bands now reside in the nearby Cedar City Indian Colony. Due to the strong temporal and spatial continuity of these Southern Paiutes with their ancestral lands, cultural resource concerns are expected to be extensive. Cultural resource data for the OB

siting area are extremely limited. Five recorded Southern Paiute historic habitation sites are located on the foothill area north of Modena. There is a high probability of numerous other sensitive sites and areas in OB disturbance zones and in adjacent mountain and perennial stream locations.

ARCHAEOLOGICAL AND HISTORICAL RESOURCES (1.1.12)

Very little systematic survey has been conducted in the vicinity of the proposed Beryl OB alternative, consequently, there are no recorded sites in the immediate OB vicinity. Two limited activity or short-term camps are located to the southwest of Beryl. One of these may be more complex, with buried deposits apparently eroding from dunes. The region to the south and east was occupied prehistorically by Puebloan peoples and historically by the Southern Paiute. Several long-term base camps occur to the north of the proposed OB alternative.

There are 22 previously recorded archaeological sites within the Beryl-Enterprise watershed where the Beryl OB is located (Table 1.1.12-1). A more accurate indicator of the probable level of sensitivity of this OB location is the estimate that 34 percent of the area within a 20 mi radius is of moderate or high sensitivity.

Paleontological Resources

The Beryl OB siting area is located on alluvial valleyfill in an area that at one time was inundated by Lake Bonneville. Important vertebrate fossils have been found in scattererd locations in the Bonneville sediments.

1.2 NATURAL ENVIRONMENT

BIOLOGICAL RESOURCES (1.2.1)

Vegetation

The proposed Beryl OB site is located in the northeast quarter of the Beryl-Enterprise District Valley (Utah-53) and the northwestern part of Pine Valley (Utah-52). The vegetation of this area is characteristic of the Escalante Desert at lower elevations and typical of mountainous vegetation associated with higher elevation ranges in this region.

Figure 1.2.1-1 shows the major vegetation types in the region surrounding the OB location and which occupy areas large enough to be mapped at the given scale.

Desert salt marsh, alkali sink scrub, shadscale, Great Basin sagebrush and pinyon-juniper woodland are the vegetation types that occur in or in close proximity to the proposed OB site. The vegetation information presented here is based on data acquired from the Bureau of Land Management and the U.S. Department of Agriculture (Technical Bulletin No. 713, Shantz, 1940).

Three desert salt marsh areas are located in the southern part of the proposed OB site. These relatively small areas are characterized by salt flats and poorly drained boggy areas. The boggy areas are dominated by patches of pickleweed (Salicornia sp.), which gradually merge into saltgrass (Distichlis spicata var. stricta) at slightly higher elevations, where the soil is somewhat drier.

Table 1.1.12-1. The locations of known site types by topographic zone in the Beryl Enterprise Watershed (53).

SITE TYPE	TOPOGRAPHIC SETTING			
	MOUNTAINS/ FOOTHILLS	UPPER BAJADA	LOWER BAJADA	VALLEY FLOOR
Multiple Activity (e.g. habitation)	0	6	1	0
Special Purpose (e.g. rockart)	0	1	0	0
Limited Activity (e.g. campsites)	0	7	4	3
Isolated finds	0	0	0	0
Total = 22	0	14	5	3
Percent = 100	-	64	23	13

3405-1

(See Chapter 3 of DEIS, Figure 3.4.1.2-1)

Figure 1.2.1-1. Vegetation cover types in the vicinity of Beryl.

Alkali sink scrub vegetation borders the desert salt marsh areas and is the dominant vegetation type in the valley bottom. Stands of pure black greasewood (Sarcobatus vermiculatus) are characteristic of the flat, level, heavy soils immediately above the salt marsh areas. On the borders of the valley floor, black greasewood is mixed with shadscale species such as shadscale (Atriplex confertifolia), and rabbitbrush (Chrysothamnus sp). This transition zone from the alkali sink scrub into the typical shadscale vegetation covers a much larger area than that occupied by black greasewood alone.

An extensive vegetation type found on bajadas within the proposed OB site is shadscale scrub. This open, low-growing community can be subdivided into a number of vegetation subtypes as identified by Shantz (1940). The vegetation may vary in some areas from a typical shadscale scrub mixture of shadscale, greasewood, rabbitbrush, and winterfat (Eurotia lanata). In those portions of the valley where there is a severe low moisture regime, small stands of pure four-wing saltbush (Atriplex canescens) and James' galleta grass (Hilaria jamesii) occur around the town of Yale and northeast of Modena, respectively. There is a rather extensive area on the lower bajadas dominated by pure stands of winterfat, which appears as whitish-gray, low, shrubby vegetation. This subtype is located north of the Union Pacific railroad tracks.

North of the railroad tracks and above the elevation of the winterfat stands, a low-growing subtype of little rabbitbrush dominates. There are several closely related species or subspecies of rabbitbrush which in some areas form nearly pure stands. Mixtures of big sagebrush (Artemisia tridentata), galleta grass, winterfat and the little rabbitbrush species typify this subtype. Great Basin sagebrush occurs immediately above the shadscale scrub type, extending further up the bajadas. This fairly dense to open homogeneous, vegetation is rather dwarfed in comparison to other big sagebrush stands elsewhere in the valley. The understory has been reduced by excessive grazing until it is almost entirely lacking in some areas. Dominant species include big sagebrush, antelope brush (Purshia tridentata) and various bunchgrass species. Within the Great Basin sagebrush type, the BLM identifies a large area west of Beryl Junction that is dominated by low sagebrush (Artemisia nova).

Above the sagebrush vegetation and at the highest elevations of the proposed OB site, pinyon-juniper vegetation occurs. Within the proposed OB site the pinyon-juniper vegetation is dominated by Utah juniper (Juniperus osteosperma), with associated understory species such as hop-sage (Grayia spinosa), big sagebrush, rubber rabbitbrush (Chrysothamnus nauseous) and Morman tea (Ephedra sp.).

In addition to natural vegetation types, a mosaic pattern of cropland and disturbance-associated vegetation occurs throughout the valley bottom, where the BLM has identified four small areas dominated by Russian thistle (Salsola iberica).

Outside of the proposed OB site the vegetation of the valley floor and bajadas is very similar to that described above. The mountainous areas to the south and east support vegetation types typical of high elevations in this region.

Above the 6,000 ft (1,830 m) elevation pinyon-juniper woodland dominates. This community of small evergreen trees with an open canopy has an understory of big sagebrush that decreases in density as the densities of the dominant woodland

species increase. Dominant woodland species include Utah junipers (Juniperus osteosperma), and singleleaf pinyon (Pinus monophylla). Shifts in dominance may occur locally in response to topographic and geographic variances. In general, junipers dominate the lowest elevations, with mixed juniper and pinyon woodlands above, and pure pinyon woodlands at the upper elevations.

The vegetation of the part of Dixie National Forest that lies within Beryl Junction Valley is described in the USDA Forest Service Draft Environmental Statement of the Enterprise Planning Unit (1974). The greatest percentage of this area is covered by mixed stands of pinyon and juniper typical of other high bajada and mountain zones of the valley. Above the pinyon-juniper woodland on the north slopes is a montane brush vegetation type dominated by Rocky Mountain oak (Quercus gambelli), black sagebrush, serviceberry (Amelanchier sp.) and narrow-leaved mountain mahogany (Cercocarpus ledifolius). A small stand of ponderosa pine (Pinus ponderosa) occurs on the rocky slopes south of Enterprise Reservoir and in the southwest corner of the Dixie National Forest.

Wildlife

The proposed OB site is located in the southernmost range of pronghorn antelope in Utah. The range extends north up the Escalante Desert, into the Wah Wah Valley, and east to near Cedar City. Mule deer occur in low numbers in the Wah Wah Mountains and the Needle Range directly north of the OB site. Summer range of a transplant population of elk occurs about 5 mi north of this base in the Needle Range.

Protected Species

The OBTS is located approximately 10 mi south of the major transplant site of the Utah prairie dog, a federaly listed endangered species, in Pine Valley, Utah. The Designated Transportation Network passes directly through this transplant population. No rare plant species or protected fish species are known from the immediate areas. The nearest rare plant population: the timber poison vetch (Astragalus convallarius var. finitimus) is located about 15 mi northwest of the potential OB site.

No substantial game fish habitats are found within 30 mi of the proposed Beryl OB.

Wilderness And Significant Natural Areas

Recommended/designated wilderness study areas and significant natural areas located within a 50 mi radius of the potential Beryl OB site are listed in Table 1.2.1-1.

SURFACE WATER (1.2.2)

Source

Perennial surface streams which enter the Beryl-Enterprise District are fed largely from winter precipitation on adjacent mountains. The intermittent and ephemeral streams are fed by runoff of melting snow and intense summer storms.

Table 1.2.1-1. Potential wilderness and significant natural areas within a 50 mile radius of the Beryl OB site.

POTENTIAL WILDERNESS AREAS	
AREA	MILES FROM OB SITE
Nevada	
1) White Rock Range	32
2) Parsnip Peak	34
3) Grapevine Spring	48
Utah	
1) Wah Wah Mountains	22
2) White Rock Range	37
3) Red Mountain	45
4) Spring Canyon	36
5) Taylor Creek Canyon	42
6) LaVerkin Creek Canyon	42
7) Red Butte	47
8) Beartrap Canyon	45
9) Home Valley Knoll	49

SIGNIFICANT NATURAL AREAS	
AREA	MILES FROM OB SITE
Nevada	
1) Gleason Canyon	28
2) Beaver Dam	32
Utah	
1) Zion National Park	38
2) Cedar Breaks	50
3) Steamboat Mountain	9
4) Indian Peak	24

3215-1

Annual precipitation ranges from less than 8 in. in parts of the valley to more than 30 in. in the mountains to the east, with most of the precipitation falling during the October-April period. Mean annual lake evaporation is around 50-52 in.

Streams

No perennial streams enter the area around Beryl, but intermittent and ephemeral streams reach the valley floor from the adjacent mountains.

Lakes And Reserviors

None.

Springs

A few seeps and springs occur, mostly near the mountain valley contacts. The discharge in Escalante Valley, in which Beryl is located, is relatively small.

Drainage

The Escalante Valley drains westward and northward toward Sevier Lake. Little surface water actually drains into or out of the valley.

Current Use

Insignificant in Beryl area.

Additional water resource analyses are presented in the Water Resources Technical Report, ETR-12.

GROUNDWATER (1.2.3)

The Beryl OB site is in the Beryl Enterprise District in the southern portion of the Escalante Desert. It is bordered in the north by the Wah Wah and Needle Ranges, in the east by the Antelope Range and in the south by the Bull Valley Mountains.

Location Of Groundwater

Groundwater occurs mainly in the alluvial fill in the valleys. Along the valley edges the depth to water may exceed 60 meters. Artesian conditions occur in the central part of the basin, and an area exists where wells flow at the surface.

Source

Virtually all recharge to the groundwater reservoir comes directly or indirectly from precipitation in the mountains. Streams issuing from the mountains and water diverted from the streams for irrigation are direct sources of recharge to the aquifers. The recharge from permeable stream channels occurs especially near canyon mouths and high on alluvial fans. All water in perennial and intermittent streams entering the area is directed for irrigation. It is estimated that about one third of this water, generally used relatively near the mountain fronts, eventually

reaches the groundwater reservoir. Recharge from well water, generally applied on finer textured soils in the center of the valley, is about one fourth of the quantity applied.

Another source of recharge to the Beryl-Enterprise district is underflow from Cedar City Valley.

Movement

Groundwater moves into the south end of Escalante Valley (the Beryl-Enterprise district) from Cedar Valley through thin alluvial deposits in mountain range gaps; the two principal sources are Iron Springs and Twentymile gaps. The amount of underflow from each is about 4.2×10^3 ft^3 per year.

Groundwater in the basin moves toward the low lying central part of the valley and then northwestward into the Lund District. From there it moves northeastward into the area around Milford.

Pumping has caused changes in water levels and thus local changes in the direction of groundwater movement, the greatest changes being north of Enterprise.

Natural Discharge

Only a few springs and seeps discharge in Escalante Valley, mostly near the mountain valley contacts. Most evaporation of groundwater occurs near these seeps and springs.

Current Use

Most groundwater discharged in the area is pumped from wells for irrigation. During 1962, 4.6×10^9 ft^3 was pumped from 307 wells in Escalante Desert. During the period 1950-62 (Sandberg, 1966), water levels declined in heavily pumped areas; the water level remained essentially unchanged in areas of little pumping. Pumpage has increased dramatically in recent years. For the period 1963-77, groundwater usage is estimated to average (79 x 10^3 AFY) 3.4 x 10^9 ft^3 per year with a single reliable estimate of perennial yield for the Beryl-Enterprise District of the Escalante Desert is not available. Estimates are available for the entire Escalante Valley and range from (5.25 x 10^3 AFY) 2.2-10.6 x 10^8 ft^3 (Eaes, Price and Harrill, 196) to (3.5 x 10^3 AFY) 1.5 x 10^8 ft^3. Evapoiranspiration near Beryl has been estimated at (5 x 10^3 AFY) 2.1 x 10^8 ft^3 (Sandberg, 1966) and can be assumed to be an order of magnitude "estimate" of perennial yield.

Quality

Most of the groundwater is fresh and suitable for most uses. No increase in salinity with depth has been observed down to 590 ft, the maximum depth sampled. Some water of poor quality exists at shallow depths in heavily pumped areas, because of the recirculation of water used for irrigation.

Mining of groundwater storage is necessary to fill the current demand. Therefore, water is not available for further allocations, and the Utah State engineer has classified the Escalante Desert a "designated" area. No new applications for water appropriations are being approved.

SOILS/SLOPES (1.2.4)

The soils of the Beryl OB site formed primarily on very gently sloping to sloping (ranging up to approximately 7 percent) older alluvial fans and terraces. The Dixie-Neola series association predominates in this study area (U.S.D.A. Soil Conservation Service, September 1960). These soils are generally shallow to moderately deep over a hardened caliche horizon (a horizon in which calcium carbonate has accumulated) and are well drained. The Dixie soils have gravelly loam surfaces underlain by a horizon of clay loam and a weak to strong cemented caliche at 15 to 36 in. (38 to 91 cm). Below the caliche is a horizon of strongly calcareous; very gravelly sandy loam. The Neola soils have sandy loam surfaces underlain by strong cemented caliche at 12 to 24 inches (30 to 61 cm). Below the caliche is a horizon of strong calcareous sandy loam. Included with the Dixie-Neola association in the Beryl area are soils of the Zane series. The Zane soils are deep and well drained. They have a clay loam surface underlain by horizons of heavy clay loam, silt loam and fine sandy loam to depths of over 60 in. (152 cm).

The Dixie-Neola association is currently used almost entirely for range, the purpose to which it is best suited. Runoff is very slow to slow and the erosion hazard is moderate to severe. The organic matter content and natural fertility of these soils are low but they are free of toxic salts and alkali. In the Dixie and Neola soils, the available moisture holding capacity is low and the effective root penetration is limited by the presence of cemented caliche horizons. In addition, the Neola soils need protection against wind erosion. In the Zane soils, the available water holding capacity is high and the effective rooting zone is deep. The Zane soils are potentially one of the best soils in the area for irrigation.

Seismicity

The Beryl site is approximately 30 mi due west of the Hurricane Fault and is subject to mild earthquake exposure. Because of the great thickness of basin fill at its site in the middle of the Escalante Desert, however, a 0.5 percent horizontal acceleration factor for structural design is recommended, similar to that of the Milford and Delta OB sites.

AIR QUALITY (1.2.5)

The State of Utah has reported particulate emissions of 3,800 tons/yr (3,447 tons/yr) for Iron County in 1976. This figure does not include windblown fugitive sources, which will be estimated at a later date. Gaseous emissions have also been reported for Iron County (see Table 1.2.5-1).

No air quality monitoring data exists for this area. The nearest air quality measurements are taken at Cedar City, Utah. Cedar City data reflects local source conditions and therefore is not representative of the Beryl region or community. A combination of residential and agricultural pollutant sources in the area make generalizations about existing air quality levels difficult to make without local air monitoring data.

The region surrounding Beryl and the community of Beryl is a Class II attainment area for all pollutants. The Cedar Breaks proposed Class I and Zion Mandatory Class I area is within 40 mi (65 km) of Beryl, Utah.

Table 1.2.5-1. Total emissions and emission density levels of alternative potential OB locations.

EMISSIONS/ EMISSION DENSITY LEVELS	POTENTIAL OPERATING BASE LOCATION						
	ELY, NEVADA[a]	COYOTE SPRINGS, NEVADA[a,b]	BERYL, UTAH[c]	MILFORD, UTAH[c]	DELTA, UTAH[c]	DALHART, TEXAS[d]	CLOVIS NEW MEXICO[c]
Total Particulate Emissions Tons/yr	72,666	115,587	3,800	2,088	4,541	51,923	28,875
Particulate Density Tons/yr/mi^2	37.4	175.9	<1	<1	<1	0.1-<10	1-<10
Total SO_x Emissions Tons/yr	274,426	33,363-274,426	974	158	294	74,928	138,083
SO_x Density Tons/yr/mi^2	30-<100	0.1-<10	<1	<1	<1	0.1-<10	<1
Total NO_x Emissions Tons/yr	12,641	12,641-96,378	1,836	943	1,588	140,323	29,202
NO_x Density Tons/yr/mi^2	<3	0.1-<30	<3	<3	<3	0.1-<30	<3
Total Hydrocarbon Emissions Tons/yr	15,673	15,673-23,071	2,223	1,186	2,114	152,036	38,471
Hydrocarbon Density Tons/yr/mi^2	<3	0.1-<10	<3	<3	<3	0.1-<30	<3
Total CO Emissions Tons/yr	74,996	74,996-131,010	11,269	6,113	11,049	1,100,143	112,916
CO Density Tons/yr/mi^2	10	0.1-30	<10	<10	<10	0.1-<30	1-<3

Climatology

Of the Nevada/Utah locations, Beryl receives the most annual precipitation, but the 11.03 inches it receives is evenly distributed throughout the year and is not a limiting factor for natural dust emissions. Dust has not been much of a problem, however, as it has been observed infrequently near Beryl.

2.0 ENVIRONMENTAL CONSEQUENCES FOR THE OPERATING BASE VICINITY

2.1 HUMAN ENVIRONMENT

EFFECTS ON EMPLOYMENT AND LABOR FORCE (2.1.1)

Beryl would be selected as an operating base location in three of the 9 project configurations, Alternatives 1, 3, and 4. Base-associated employment, including spillover employment impacts from other counties, notably Beaver, for alternatives in which Milford would be an operating base, represent the only potential sources of M-X-related employment in the county. No DDA facilities are located in the county.

Direct, Indirect, and Total M-X Related Employment

Employment effects primarily result from the project's demand for construction and operations labor. Tables 2.1.1-1 through 2.1.1-3 present direct, indirect and total labor requirements for the three M-X alternatives which would site a base near Beryl. It would be a first operating base under Alternatives 3 and 4, and a second operating base under Alternative 1. The impacts of Alternatives 3 and 4 are virtually the same, while those for Alternative 1 would be substantially less.

Table 2.1.1-2--summarizing Iron County employment with Alternative 3--indicates that construction of the base would begin in 1982 and last for 5 years, peaking at 2,300 workers in 1984. Compared to baseline trend growth employment projections developed by the Bureau of Economic and Business Research, University of Utah, this peak demand figure would be almost four-and-one-half times as large as projected county employment of 500 persons in the contract construction industry (University of Utah, BEBR, October 1980). Employment demand of this magnitude would induce significant short-run stress in the county's building trades industry, creating shortages of skilled workers, wage inflation, and large-scale in-migration of workers into Iron County. Operation of the base would begin in 1984, with full base staffing by 1991. A first operating base (Alternatives 3 and 4) requires a long-run direct employment level of 7,500 persons, of which 85 percent would be military. Under Alternative 1, where a second operating base would be sited at Beryl, total direct labor required would be much less, particularly over the initial build-up phase (see Table 2.1.1-1).

Large numbers of jobs indirectly related to M-X also would be created in Iron County. The principal source of expansion would be the respending of project payrolls earned by direct employees. There also would be base procurement of goods and services from area suppliers, who in turn would expand employment to meet the increased demand. Project-related investment by governments and private businesses also would induce secondary job creation. Table 2.1.1-2 indicates that indirect employment would peak at 5,100 jobs during 1985-1986, and decline thereafter, until reaching about 900 jobs, beginning in 1991.

Table 2.1.1-2 indicates that peak employment by place of work in the county is forecast to equal as much as 13,000 jobs in 1986, 150 percent of trend-growth

Table 2.1.1-1.

M-X RELATED SYSTEM EMPLOYMENT BY PLACE OF EMPLOYMENT, IN IRON

ALTERNATIVE 1. FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT COYOTE SPRINGS, NV (CLARK CO.)
BASE II AT BERYL, UT (IRON CO.)

TYPE OF EMPLOYMENT	NUMBER OF JOBS												
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TECHNICAL FACILITIES													
CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0	0
ASSEMBLY + CONSTRUC	0	0	0	0	0	0	0	0	0	0	0	0	0
BASE													
CONSTRUCTION	0	0	0	200	1350	2050	1450	750	0	0	0	0	0
ASSEMBLY AND CHECKOUT	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS													
OFFICERS	0	0	0	0	100	200	350	450	450	450	450	450	450
ENLISTED PERSONNEL	0	0	0	0	1100	2200	3250	4400	4400	4400	4400	4400	4400
CIVILIANS	0	0	0	0	200	400	650	850	850	850	850	850	850
TOTAL DIRECT	0	0	0	200	2750	4850	5700	6450	5700	5700	5700	5700	5700
INDIRECT	0	0	523	1527	2830	3936	3892	3227	2197	957	666	657	657
TOTAL	0	0	523	1727	5580	8786	9592	9677	7897	6657	6366	6357	6357

SOURCE HDR SCIENCES, 31-OCT-80

Table 2.1.1-2.

M-X RELATED SYSTEM EMPLOYMENT BY PLACE OF EMPLOYMENT, IN IRON

ALTERNATIVE 3. FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT BERYL, UT (IRON CO.)
BASE II AT ELY, NV (WHITE PINE CO.)

TYPE OF EMPLOYMENT	NUMBER OF JOBS												
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TECHNICAL FACILITIES													
CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0	0
ASSEMBLY + CONSTRUC	0	0	0	0	0	0	0	0	0	0	0	0	0
BASE													
CONSTRUCTION	1150	1900	2300	2000	1200	0	0	0	0	0	0	0	0
ASSEMBLY AND CHECKOUT	0	350	900	1800	2850	2850	2800	2650	50	0	0	0	0
OPERATIONS													
OFFICERS	0	0	100	200	300	400	500	600	600	600	600	600	600
ENLISTED PERSONNEL	0	0	950	1925	2900	3850	4800	5750	5750	5750	5750	5750	5750
CIVILIANS	0	0	200	375	550	750	950	1150	1150	1150	1150	1150	1150
TOTAL DIRECT	1150	2250	4450	6300	7800	7850	9050	10150	7550	7500	7500	7500	7500
INDIRECT	940	2329	3739	5163	5172	4260	3448	1901	1029	875	868	868	868
TOTAL	2090	4579	8189	11463	12972	12110	12498	12051	8579	8375	8368	8368	8368

SOURCE HDR SCIENCES, 31-OCT-80

Table 2.1.1-3.

M-X RELATED SYSTEM EMPLOYMENT BY PLACE OF EMPLOYMENT, IN IRON

ALTERNATIVE 4: FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT BERYL, UT (IRON CO.)
BASE II AT COYOTE SPRINGS, NV (CLARK CO.)

TYPE OF EMPLOYMENT	NUMBER OF JOBS												
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TECHNICAL FACILITIES													
CONSTRUCTION	0	0	0	0	0	0	0	0	0	0	0	0	0
ASSEMBLY + CONSTRUC	0	0	0	0	0	0	0	0	0	0	0	0	0
BASE													
CONSTRUCTION	1150	1900	2300	2000	1200	0	0	0	0	0	0	0	0
ASSEMBLY AND CHECKOUT	0	350	900	1800	2850	2850	2800	2650	50	0	0	0	0
OPERATIONS													
OFFICERS	0	0	100	200	300	400	500	600	600	600	600	600	600
ENLISTED PERSONNEL	0	0	950	1925	2900	3850	4800	5750	5750	5750	5750	5750	5750
CIVILIANS	0	0	200	375	550	750	950	1150	1150	1150	1150	1150	1150
TOTAL DIRECT	1150	2250	4450	6300	7800	7850	9050	10150	7550	7500	7500	7500	7500
INDIRECT	940	2329	3739	5163	5172	4260	3448	1901	1029	875	868	868	868
TOTAL	2090	4579	8189	11463	12972	12110	12498	12051	8579	8375	8368	8368	8368

SOURCE: HDR SCIENCES, 31-OCT-80

employment projections of 8,700 jobs. Adjusted for workers in the county who reside in other counties, this figure of 13,000 adjusts downward to 12,200 jobs, 140 percent of trend growth employment projections. Over the long-run, under Alternatives 3 and 4, the M-X induced change in employment by place of employment would equal 8,400 jobs, or 7,600 jobs by place of residence. This latter figure represents a 75 percent increase above baseline employment projected for that period. No large additional projects in Iron County appear likely during the same time period.

These employment impacts have been estimated using a system of county-level interindustry models derived form the Regional Industrial Multiplier System. As a means of checking the validity of these results, a simulation analysis also was performed using a dynamic economic-base model developed at the Bureau of Economic and Business Research, University of Utah. The simulation results relative to the baseline are compared to the interindustry results in Figure 2.1.1-1.

The income-sensitive interindustry analysis indicates higher employment effects during the peak of construction activity than the simulation analysis, primarily because of high projected earnings of construction and assembly and checkout personnel. The simulation model also is extremely sensitive to the phasing out of construction employment at the base after 1986. In the long-run, however, both approaches indicate that the M-X operating base would increase county employment 75 percent above baseline conditions.

Employment in Iron County traditionally has been dominated by government, agriculture, and services. The county has grown at historical rates comparable to those of the western United States as a whole, posting a 3.8 percent annual employment growth rate over the 1967-1977 period. The county economy would experience boom-type growth, given the projected rapid build-up of M-X employment. Cedar City currently is the only town of any size, though Beryl would expand greatly as a result of M-X. These and other communities would experience skilled labor shortages, general wage and price inflation, and a large in-migration of project workers. Over the initial phases of the project, this in-migration would be comprised of construction and assembly and checkout workers, while over the long run, much of the employment growth would be comprised of military personnel.

Growth of ancillary industries to supply consumption demands and base support needs would change the county's economic structure. Increased numbers of hotels, restaurants, clothing stores, and chain-type supermarkets, for example, would characterize this economic growth. After the peak of project construction and assembly and checkout activity has passed, local wage and price pressures would subside. The county would, however, experience long-term increases in many prices and incomes as long as the base remains in operation.

Labor Force Impacts

Markets for skilled construction labor, e.g. ironworkers and operating engineers, could be very tight during peak construction activity, leading to short-run, but significant escalation of wages for these construction crafts. These labor shortages would extend to other occupations as more mobile workers would seek relatively higher wages paid on M-X jobs. With a relatively small local labor force, significant in-migration of additional workers would result. Tables 2.1.1-4 through 2.1.1-6 present labor in-migration estimates for Iron County for those deployment

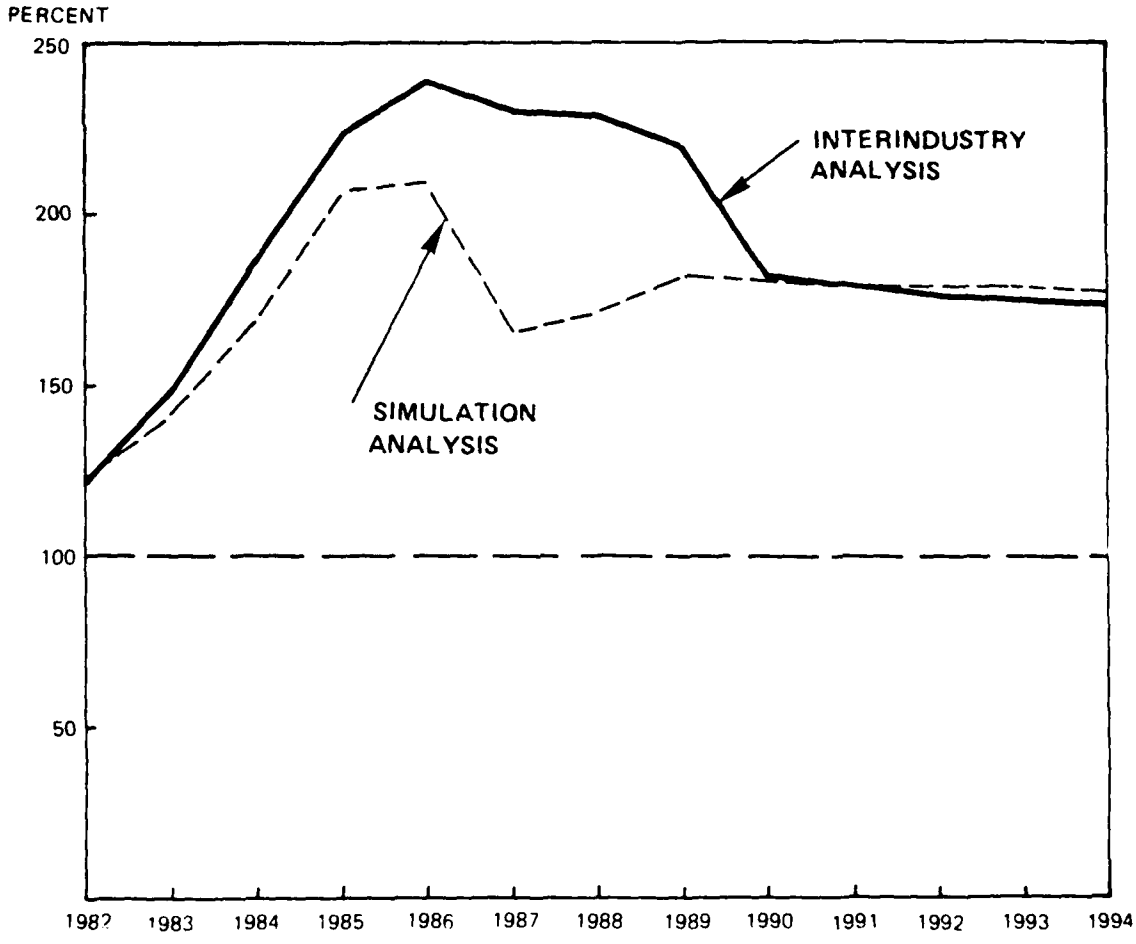

Figure 2.1.1-1. Iron County employment with M-X as percent of employment without M-X: Alternative 3.

Table 2.1.1-4. TOTAL CIVILIAN M-X RELATED EMPLOYMENT, AVAILABLE RESIDENT LABOR FORCE, AND NET CIVILIAN LABOR FORCE IMPACT BY PLACE OF RESIDENCE FOR IRON

ALTERNATIVE 1 FULL DEPLOYMENT - NEVADA/UTAH (L)
BASE I AT COYOTE SPRINGS, NV (CLARK CO.)
BASE II AT BERYL, UT (IRON CO.)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TOTAL CIVILIAN M-X-RELATED EMPLOYMENT	0	0	533	1715	3892	5524	5315	4399	2919	1680	1388	1300	1380
AVAILABLE RESIDENT LABOR FORCE	221	228	236	244	250	256	262	268	274	279	285	290	294
NET CIVILIAN LABOR FORCE IMPACT	0	0	405	1500	3731	5406	5182	4246	2811	2058	2056	2055	2053

SOURCE HDR SCIENCES, 31-OCT-80

Table 2.1.1-5. TOTAL CIVILIAN M-X RELATED EMPLOYMENT, AVAILABLE RESIDENT LABOR FORCE, AND NET CIVILIAN LABOR FORCE IMPACT BY PLACE OF RESIDENCE FOR IRON

ALTERNATIVE 3 FULL DEPLOYMENT - NEVADA/UTAH (L)
BASE I AT BERYL, UT (IRON CO.)
BASE II AT ELY, NV (WHITE PINE CO.)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TOTAL CIVILIAN M-X-RELATED EMPLOYMENT	1630	3819	6199	8549	9292	7765	7055	5529	2056	1852	1846	1846	1846
AVAILABLE RESIDENT LABOR FORCE	221	228	236	244	250	256	262	268	274	279	285	290	294
NET CIVILIAN LABOR FORCE IMPACT	1506	3728	6092	8442	9158	7642	6964	5452	2824	2772	2771	2769	2768

SOURCE HDR SCIENCES, 31-OCT-80

Table 2.1.1-6. TOTAL CIVILIAN M-X RELATED EMPLOYMENT, AVAILABLE RESIDENT LABOR FORCE, AND NET CIVILIAN LABOR FORCE IMPACT BY PLACE OF RESIDENCE FOR IRON

ALTERNATIVE 4 FULL DEPLOYMENT - NEVADA/UTAH (L)
BASE I AT BERYL, UT (IRON CO.)
BASE II AT COYOTE SPRINGS, NV (CLARK CO.)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TOTAL CIVILIAN M-X-RELATED EMPLOYMENT	1630	3819	6199	8549	9292	7765	7055	5529	2056	1852	1846	1846	1846
AVAILABLE RESIDENT LABOR FORCE	221	228	236	244	250	256	262	268	274	279	285	290	294
NET CIVILIAN LABOR FORCE IMPACT	1506	3728	6092	8442	9158	7642	6964	5452	2824	2772	2771	2769	2768

SOURCE HDR SCIENCES, 31-OCT-80

options which would site a base at Beryl Junction. These labor-force in-migration estimates are very important because they are the key determinant of population in-migration. Population changes, in turn, imply changes in the demand for community services, housing, and infrastructure, which are of critical policy and planning importance.

For Alternative 3, for example (Table 2.1.1-5), total civilian M-X related employment is presented in the first line, and represents direct and indirect M-X labor demand presented in Table 2.1.1-2 with an adjustment for cross-county commuting. This figure peaks at 9,300 persons in 1986.

In the same year, the county's available resident labor force is projected to equal about 300 persons. This includes the projected unemployed labor force (assuming a continuation of historical unemployment rates) less an estimate of those persons who would remain unemployed even under extremely tight labor market conditions. This available resident labor force also is disaggregated by skill category.

The third line in Table 2.1.1-5, "net civilian labor force impact," is a comparison of the projected available labor pool in Iron County (under baseline conditions) with M-X demand for labor. It represents cumulative labor in-migration into the county, which in 1986, is forecast to equal 9,200 persons, i.e., up to and including 1986, 9,200 civilian workers would in-migrate into the county. Thereafter, Table 2.1.1-5 indicates a decline in the "net civilian labor force impact" figure, indicating worker out-migration as job opportunities in the county diminish. The figure stabilizes at about 2,800 persons; indicating total or cumulative in-migration into Iron County over the period 1982-1994 under Alternative 3. Alternative 4 would have identical impacts, while Alternative 1 would have much lower civilian in-migration estimates.

Subsequent to peak in-migration, local labor markets would become less tight. Unemployment rates would rise, labor force participation rates would fall, and the induced rise in some relative wages, e.g., construction workers, would begin to diminish.

EFFECTS ON INCOME AND EARNINGS (2.1.2)

Earnings impacts in Iron County are closely related to those employment effects discussed in Section 2.1.1. Tables 2.1.2-1 and 2.1.2-2 present M-X-related earnings by place of work for Alternatives 1 and 3, respectively. Earnings in Iron County would also be significantly increased under Alternative 4, where Beryl Junction would be the location of a first operating base but effects under this alternative are identical to those for Alternative 3. As the location of a first operating base, Table 2.1.2-2 indicates that earnings would peak at $230 million, about 3 times 1978 county earnings of $81 million (1980 dollars). Over the long run, annual projected earnings would rise by about $115 million. Effects in the county from the location of a second operating base at Beryl would be significantly less (Table 2.1.2-1). However, in both cases, the county would be severely stressed with such a rapid, large infusion of earnings.

Much of the county's growth is expected to occur in Cedar City, though Beryl also is likely to expand sharply as a result of M-X. Boom-type growth is likely with

Table 2.1.2-1.

MX RELATED EARNINGS, IN MILLIONS OF FY 1980 DOLLARS, IN IRON

ALTERNATIVE I FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT COYOTE SPRINGS, NV (CLARK CO)
BASE II AT BERYL, UT (IRON CO)

SOURCE OF EARNINGS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLUSTER FACILITIES CONSTRUCTION, ASSEMBLY, AND CHECKOUT	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
BASE CONSTRUCTION, ASSEMBLY, AND CHECKOUT	0 0	0 0	0 0	6 7	45 4	68 9	48 7	25 2	0 0	0 0	0 0	0 0	0 0
OPERATIONS	0 0	0 0	0 0	0 0	19 1	38 1	58 9	78 5	78 5	78 5	78 5	78 5	78 5
INDIRECT	0 0	0 0	6 8	19 9	36 8	51 2	50 6	41 9	28 6	12 4	8 7	8 5	8 5
TOTAL	0 0	0 0	6 8	26 6	101 2	158 2	158.2	145 7	107 1	91 0	87 2	87 1	87.1

SOURCE MDR SCIENCES, 31-OCT-80

Table 2.1.2-2.

MX RELATED EARNINGS, IN MILLIONS OF FY 1980 DOLLARS, IN IRON

ALTERNATIVE 3 FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT BERYL, UT (IRON CO)
BASE II AT ELY, NV (WHITE PINE CO)

SOURCE OF EARNINGS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLUSTER FACILITIES CONSTRUCTION, ASSEMBLY, AND CHECKOUT	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
BASE CONSTRUCTION, ASSEMBLY, AND CHECKOUT	38 6	72 6	99 8	112 2	111 6	71 3	70 0	66 3	1 3	0 0	0 0	0 0	0 0
OPERATIONS	0 0	0 0	17 4	34 5	51 6	69 0	86 3	103 7	103 7	103 7	103 7	103 7	103 7
INDIRECT	12 2	30 3	48 6	67 1	67 2	55 4	44 8	24 7	13 4	11 4	11 3	11 3	11 3
TOTAL	50 9	102 9	165 7	213 8	230 4	195 6	201 2	194 7	118 3	115 1	115 0	115 0	115 0

SOURCE MDR SCIENCES, 31-OCT-80

attendant wage and price inflation, particularly during the construction phase. The county has historically been rural, with relatively small commercial and industrial sectors, though it has grown moderately in the recent past. With a 1978 per capita income of $5,269, much lower than the state or nation, rapid influx of high paid construction workers, then direct operations phase workers, significant change in the size and structure of the county's economy would occur.

EFFECTS ON PUBLIC FINANCE (2.1.3)

This section presents the aggregate expenditures, revenues and net impacts estimated for local governments in Iron County area, (trend growth scenario) under the Proposed Action and each alternative. Peak year and long-term capital expenditure requirements also are presented. The effects discussed reflect aggregate figures and can not be interpreted as estimates associated with a specific jurisdiction. However, effects specific to the local school district constitute a major portion of the aggregate effects and are presented separately.

The net fiscal impact in the Iron County area are largest under Alternatives 3 and 4 where Operating Base I is proposed. Peak year (1985) deficits amount to approximately $2.0 million in 1985 under both Alternatives (Table 2.1.3-1). Under Alternative 1 where a smaller second operating base is proposed for the area peak year deficits are slightly less ($1.7 million) and occur in 1987. Under the Proposed Action and the remaining alternative peak year deficits are substantially reduced and generally fall under $500,000 (less than 3.0 percent of estimated expenditure levels) in the peak years. The potential for the deterioration of service levels during the early years of the project is quite high under all alternatives (except Alternative 8) and mitigation strategies and/or substantial outside aid are required. No significant adverse effects in the long-term are anticipated in the area.

Effects on the education system follow similar patterns. Largest effects are felt under Alternatives 1, 3, and 4 where operating bases are proposed for the area. However, while expenditure requirements (assuming service levels are not allowed to deteriorate) peak in the 1986 and 1987 periods maximum deficits under Altenatives 3 and 4 occur in 1983 (approximately $500,000) and in 1986 ($600,000) under Alternative 1. Though some deficits in the early years are anticipated under the remaining alternatives the level of these deficits do not reflect significant adverse impacts. No long term adverse impacts are expected under any of the alternatives (Table 2.1.3-2).

Capital expenditure requirements for the Proposed Action, Alternatives 1 through 6, and Alternative 8 are presented for the Iron County area in Table 2.1.3-3. Impacts are greatest under Alternative 1, the OB II site, and Alternatives 3 and 4 the OB I location.

Total long-term capital expenditures under Alternative 1 amount to $24.2 million. Under Alternative 3 and 4, the location of the larger OB I, total capital outlays of $32.1 approximately 33 percent greater than under Alternative 1, are anticipated. In all three of the operating base locations, school expenditures account for 67 percent of total capital outlays in the long term. Under the remaining alternatives long-term capital expenditure requirements are substantially less.

[illegible] ASSESSMENT REVENUES, EXPENDITURES, AND NET IMPACTS (THOUSANDS OF 1990 $) (1% BASELINE GROWTH)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
PROPOSED ACTION													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18729	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	16705	17234	17830	18569	19310	20780	21491	21995	22275	22504	22866	23239	23592
DIFFERENCE	0	0	0	105	581	1411	1663	1697	1500	1349	1318	1313	1310
PCT DIFF	0.00	0.00	0.00	0.57	4.12	7.28	8.39	8.36	7.22	6.38	6.12	5.99	5.88
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17438	17990	18612	19461	20948	21933	22539	22977	23163	23493	23887	24278	24646
DIFFERENCE	0	0	0	187	1188	1714	1842	1789	1479	1402	1394	1390	1386
PCT DIFF	0.00	0.00	0.00	0.97	6.01	8.48	8.90	8.44	6.82	6.35	6.20	6.07	5.96
MX INDUCED													
NET IMPACT	0	0	0	82	407	303	129	91	21	53	27	27	27
ALTERNATIVE 1													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18729	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	16705	17234	18174	20095	24822	27435	32010	33109	31781	30753	30702	31029	31432
DIFFERENCE	0	0	345	1631	5893	10066	12182	12811	11006	9597	9154	9102	9150
PCT DIFF	0.00	0.00	2.04	8.83	31.13	51.97	61.44	63.12	52.98	45.37	42.48	41.74	41.06
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17438	17990	19283	21787	27324	32006	33650	34219	32394	31544	31951	32345	32713
DIFFERENCE	0	0	672	2513	7565	11787	12953	13031	10708	9461	9458	9457	9454
PCT DIFF	0.00	0.00	3.61	13.04	38.28	58.30	62.58	61.50	49.38	42.84	42.05	41.32	40.64
MX INDUCED													
NET IMPACT	0	0	307	882	1672	1721	-770	-219	298	176	304	304	304
ALTERNATIVE 2													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18927	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	16705	17234	17830	18533	19173	19654	20046	20379	20779	21155	21548	21926	22282
DIFFERENCE	0	0	0	70	246	285	219	81	4	0	0	0	0
PCT DIFF	0.00	0.00	0.00	0.38	1.29	1.47	1.10	0.40	0.02	0.00	0.00	0.00	0.00
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17438	17990	18612	19402	20121	20510	20910	21199	21686	22083	22493	22888	23259
DIFFERENCE	0	0	0	128	362	291	213	11	0	0	0	0	0
PCT DIFF	0.00	0.00	0.00	0.67	1.83	1.44	1.03	0.05	0.00	0.00	0.00	0.00	0.00
MX INDUCED													
NET IMPACT	0	0	0	57	118	7	-6	70	4	0	0	0	0
ALTERNATIVE 3													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18927	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	18174	21201	25035	30185	32614	33828	33960	33535	32833	32650	33632	34017	34370
DIFFERENCE	1469	3967	7205	11722	13686	14459	14132	13238	12058	11495	12084	12091	12088
PCT DIFF	8.79	23.02	44.89	63.48	72.30	74.66	71.27	65.22	58.04	54.35	56.12	55.14	54.29
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17907	21143	24644	28398	31456	33510	34567	34672	34188	33535	34284	35126	35744
DIFFERENCE	469	3153	6031	9124	11696	13291	13871	13483	12502	11452	11791	12238	12485
PCT DIFF	2.69	17.53	32.40	47.34	59.19	65.74	67.03	63.65	57.65	51.86	52.41	53.48	53.68
MX INDUCED													
NET IMPACT	-2	1717	3076	4202	4330	3183	1132	330	303	152	190	111	111

[illegible]

ALTERNATIVE 4												
REVENUES												
WITHOUT MX	16705	17234	17830	18464	18929	[illegible]	[illegible]	20298	20775	21155	21548	21926	22282
WITH MX	18174	21261	25935	30182	32614	[illegible]	[illegible]	33545	33823	33250	33642	34017	34370
DIFFERENCE	1469	4027	8105	11722	13685	14332	13514	13247	13048	12095	12094	12091	12088
PCT DIFF	8 79	23 02	44 89	63 48	72 30	[illegible]	[illegible]	65 25	62 84	57 17	56 12	55 14	54 25
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	[illegible]	21188	21686	22083	22493	22888	23259
WITH MX	19836	23464	28442	32986	34470	35040	34568	34027	34188	34575	34984	35376	35744
DIFFERENCE	2398	5474	9811	13712	14710	14821	13971	12889	12502	12492	12491	12488	12485
PCT DIFF	13 75	30 43	52 72	71 14	74 45	67 37	67 02	60 83	57 65	56 57	55 53	54 56	53 68
MX INDUCED													
NET IMPACT	929	1507	1829	1990	1025	142	139	318	983	997	998	997	997
ALTERNATIVE 5													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18929	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	16773	17537	18648	19945	20943	21482	22042	22663	22891	23014	23347	23718	24070
DIFFERENCE	68	303	819	1481	2013	2113	2214	2365	2116	1859	1799	1792	1788
PCT DIFF	0 41	1 76	4 59	8 02	10 64	10 91	11 17	11 65	10 18	8 79	8 35	8 17	8 02
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17541	18446	19731	21162	22139	22468	23144	23758	23752	24004	24400	24790	25158
DIFFERENCE	103	456	1120	1888	2380	2249	2447	2570	2066	1921	1906	1902	1898
PCT DIFF	0 59	2 53	6 02	9 80	12 04	11 12	11 82	12 13	9 53	8 70	8 48	8 31	8 16
MX INDUCED													
NET IMPACT	36	-152	-301	407	-366	136	233	204	50	62	-107	110	-110
ALTERNATIVE 6													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18929	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	16773	17537	18648	19945	20943	21482	22042	22663	22891	23014	23347	23718	24070
DIFFERENCE	68	303	819	1481	2013	2113	2214	2365	2116	1859	1799	1792	1788
PCT DIFF	0 41	1 76	4 59	8 02	10 64	10 91	11 17	11 65	10 18	8 79	8 35	8 17	8 02
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17541	18446	19731	21162	22139	22468	23144	23758	23752	24004	24400	24790	25158
DIFFERENCE	103	456	1120	1888	2380	2249	2447	2570	2066	1921	1906	1902	1898
PCT DIFF	0 59	2 53	6 02	9 80	12 04	11 12	11 82	12 13	9 53	8 70	8 48	8 31	8 16
MX INDUCED													
NET IMPACT	36	-152	-301	407	-366	-136	233	204	50	62	-107	110	-110
ALTERNATIVE 8A													
REVENUES													
WITHOUT MX	16705	17234	17830	18464	18929	19369	19828	20298	20775	21155	21548	21926	22282
WITH MX	16705	17234	17830	18464	19026	19702	19985	20331	20775	21155	21548	21926	22282
DIFFERENCE	0	0	0	0	97	333	157	33	0	0	0	0	0
PCT DIFF	0 00	0 00	0 00	0 00	0 51	1 72	0 79	0 16	0 00	0 00	0 00	0 00	0 00
EXPENDITURES													
WITHOUT MX	17438	17990	18612	19274	19760	20219	20697	21188	21686	22083	22493	22888	23259
WITH MX	17438	17990	18612	19274	19938	20532	20791	21188	21686	22083	22493	22888	23259
DIFFERENCE	0	0	0	0	179	313	93	0	0	0	0	0	0
PCT DIFF	0 00	0 00	0 00	0 00	0 91	1 55	0 45	0 00	0 00	0 00	0 00	0 00	0 00
MX INDUCED													
NET IMPACT	0	0	0	0	82	20	64	33	0	0	0	0	0

SOURCE: HDR SCIENCE [illegible]

ALL ESTIMATES REFLECT AGGREGATE REVENUES AND EXPENDITURES FOR ALL LOCAL GOVERNMENTAL UNITS (COUNTIES, CITIES, SCHOOL DISTRICTS, SPECIAL PURPOSE DISTRICTS) WITHIN THE [illegible]

Table 2.1.3-2. (Page 1 of 2)

SCHOOL DISTRICT REVENUES, EXPENDITURES, AND NET IMPACTS (THOUSANDS FY 1980 $) (1) BASELINE - LOW
COUNTY - IRON

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PROPOSED ACTION													
REVENUES													
WITHOUT MX	9790	10100	10449	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	9790	10100	10449	10820	11609	12341	12809	13126	13287	13401	13608	13826	14032
DIFFERENCE	0	0	0	64	516	990	1170	1231	1115	1003	980	976	974
PCT DIFF	0.00	0.00	0.00	0.60	4.64	8.72	10.24	10.35	9.15	8.09	7.76	7.60	7.46
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13165
WITH MX	9870	10183	10535	11013	11883	12453	12800	13063	13180	13364	13592	13813	14021
DIFFERENCE	0	0	0	103	699	1008	1085	1070	905	864	860	858	856
PCT DIFF	0.00	0.00	0.00	0.95	6.25	8.81	9.26	8.92	7.37	6.91	6.75	6.62	6.50
MX INDUCED													
NET IMPACT	0		0	39	184	18	105	161	209	137	120	118	118
ALTERNATIVE 1													
REVENUES													
WITHOUT MX	9790	10100	10449	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	9790	10100	10666	11848	15327	18873	21081	22196	21288	20301	20385	20605	20812
DIFFERENCE	0	0	217	1028	4231	7521	9461	10301	9114	8104	7757	7755	7754
PCT DIFF	0.00	0.00	2.09	9.50	38.16	66.26	81.42	86.60	74.86	65.36	61.43	60.36	59.38
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13165
WITH MX	9870	10183	10891	12270	16018	19231	20681	21579	20352	20115	20345	20568	20776
DIFFERENCE	0	0	357	1361	4833	7786	8966	9586	8077	7615	7613	7613	7611
PCT DIFF	0.00	0.00	3.39	12.47	43.21	68.03	76.53	79.93	65.83	60.92	59.79	58.76	57.81
MX INDUCED													
NET IMPACT	0	0	140	-333	-600	-265	426	715	832	482	144	143	143
ALTERNATIVE 2													
REVENUES													
WITHOUT MX	9790	10100	10447	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	9790	10100	10447	10862	11248	11545	11769	11958	12178	12398	12628	12850	13058
DIFFERENCE	0	0	0	42	155	194	149	62	3	0	0	0	0
PCT DIFF	0.00	0.00	0.00	0.38	1.39	1.71	1.29	0.53	0.03	0.00	0.00	0.00	0.00
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13165
WITH MX	9870	10183	10535	10977	11328	11599	11809	11999	12275	12500	12732	12955	13165
DIFFERENCE	0	0	0	68	144	155	94	6	0	0	0	0	0
PCT DIFF	0.00	0.00	0.00	0.62	1.29	1.35	0.80	0.05	0.00	0.00	0.00	0.00	0.00
MX INDUCED													
NET IMPACT	0	0	0	26	89	39	56	56	3	0	0	0	0
ALTERNATIVE 3													
REVENUES													
WITHOUT MX	9790	10100	10447	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	10714	12713	14695	17205	21242	24301	25737	25768	25423	25636	25868	26081	26287
DIFFERENCE	924	2613	4248	6384	10149	12950	14117	13873	13248	13238	13240	13231	13229
PCT DIFF	9.44	25.87	34.04	58.99	91.48	91.18	91.71	91.41	84.17	83.05	81.03	79.62	78.73
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13165
WITH MX	11273	13288	15511	17454	20663	23139	24845	25302	25255	25252	25279	25487	25687
DIFFERENCE	1403	3105	4976	6545	9479	11695	13130	13309	12980	12752	12547	12532	12521
PCT DIFF	14.21	30.50	47.23	60.00	84.75	102.18	112.06	110.97	105.74	102.01	98.54	96.72	95.12
MX INDUCED													
NET IMPACT	479	492	728	161	2652	1644	2013	1436	2780	2981	2706	2707	2707

Table 2.1.3-2. (Page 2 of 2)

ALTERNATIVE 4													
REVENUES													
WITHOUT MX	9790	10100	10449	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	10214	12713	16093	17203	21242	21701	22277	22768	22423	22632	22840	23081	23287
DIFFERENCE	424	2613	5647	6444	10148	10350	10657	10873	10248	10234	10212	10231	10229
PCT DIFF	9 44	25 87	54 04	78 22	91 48	91 18	91 71	91 41	84 17	82 55	81 03	79 62	78 77
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13169
WITH MX	11273	13288	16529	17454	20663	20750	21718	22045	22302	22525	22757	22979	23187
DIFFERENCE	1402	3105	5994	6545	9479	9306	10003	10052	10028	10025	10025	10023	10021
PCT DIFF	14 21	30 50	56 90	78 33	84 75	81 31	85 38	83 82	81 69	80 21	78 74	77 37	76 12
MX INDUCED													
NET IMPACT	-478	-493	348	-81	669	1044	694	821	220	208	206	207	207
ALTERNATIVE 5													
REVENUES													
WITHOUT MX	9790	10100	10449	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	9837	10306	11011	11850	12506	12858	13193	13594	13740	13775	13961	14177	14383
DIFFERENCE	47	206	563	1030	1413	1507	1573	1699	1565	1377	1333	1327	1325
PCT DIFF	0 48	2 04	5 38	9 52	12 73	13 28	13 54	14 28	12 85	11 11	10 56	10 33	10 14
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13169
WITH MX	9938	10457	11201	12017	12562	12744	13146	13515	13529	13677	13901	14122	14331
DIFFERENCE	68	274	666	1107	1377	1299	1431	1522	1254	1177	1169	1167	1163
PCT DIFF	0 69	2 69	6 32	10 15	12 32	11 35	12 22	12 69	10 21	9 42	9 18	9 01	8 85
MX INDUCED													
NET IMPACT	-21	68	101	77	35	208	142	177	311	200	164	160	159
ALTERNATIVE A													
REVENUES													
WITHOUT MX	9790	10100	10449	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	9837	10306	11011	11850	12506	12858	13193	13594	13740	13775	13961	14177	14383
DIFFERENCE	47	206	563	1030	1413	1507	1573	1699	1565	1377	1333	1327	1325
PCT DIFF	0 48	2 04	5 38	9 52	12 73	13 28	13 54	14 28	12 85	11 11	10 56	10 33	10 14
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13169
WITH MX	9938	10457	11201	12017	12562	12744	13146	13515	13529	13677	13901	14122	14331
DIFFERENCE	68	274	666	1107	1377	1299	1431	1522	1254	1177	1169	1167	1163
PCT DIFF	0 69	2 69	6 32	10 15	12 32	11 35	12 22	12 69	10 21	9 42	9 18	9 01	8 85
MX INDUCED													
NET IMPACT	-21	68	101	77	35	208	142	177	311	200	164	160	159
ALTERNATIVE 8A													
REVENUES													
WITHOUT MX	9790	10100	10449	10820	11093	11351	11620	11895	12175	12398	12628	12850	13058
WITH MX	9790	10100	10449	10820	11131	11307	11733	11921	12175	12398	12628	12850	13058
DIFFERENCE	0	0	0	0	38	-44	116	26	0	0	0	0	0
PCT DIFF	0 00	0 00	0 00	0 00	0 32	-1 37	1 00	0 22	0 00	0 00	0 00	0 00	0 00
EXPENDITURES													
WITHOUT MX	9870	10183	10535	10909	11184	11444	11715	11993	12275	12500	12732	12955	13169
WITH MX	9870	10183	10535	10909	11227	11616	11765	11993	12275	12500	12732	12955	13169
DIFFERENCE	0	0	0	0	43	171	49	0	0	0	0	0	0
PCT DIFF	0 00	0 00	0 00	0 00	0 05	1 50	0 42	0 00	0 00	0 00	0 00	0 00	0 00
MX INDUCED													
NET IMPACT	0	0	0	0	17	16	66	-26	0	0	0	0	0

SOURCE: HDR SCIENCES

(1) ESTIMATES REFLECT AGGREGATE REVENUES AND EXPENDITURES OF ALL SCHOOL DISTRICTS WITHIN THE COUNTY

4 NOV 80

[illegible]

[illegible] CAPITAL EXPENDITURE REQUIREMENTS (THOUSANDS OF 1980 $) BASELINE 3.34
[illegible]

SERVICE	LONG TERM (1990)	ANNUAL INVESTMENT REQUIRED (1)	FIVE YEAR
[illegible] ACCESS			
GENERAL OBLIGATION BOND ITEMS (2)	1562.8	781.4	2343.7
REVENUE BOND ITEMS (3)	1152.4	584.7	1446.1
SCHOOLS	1830.2	915.1	2319.7
TOTAL	4562.3	2281.2	5998.0
ALTERNATIVE 1			
GENERAL OBLIGATION BOND ITEMS (2)	5510.9	2265.5	11031.0
REVENUE BOND ITEMS (3)	3111.9	1706.0	7088.7
SCHOOLS	16277.3	5625.8	20507.1
TOTAL	24220.1	9197.2	38621.8
ALTERNATIVE 2			
GENERAL OBLIGATION BOND ITEMS (2)	0.0	0.0	522.4
REVENUE BOND ITEMS (3)	0.0	0.0	313.3
SCHOOLS	0.0	0.0	414.5
TOTAL	0.0	0.0	1250.2
ALTERNATIVE 3			
GENERAL OBLIGATION BOND ITEMS (2)	5698.5	5825.7	14019.8
REVENUE BOND ITEMS (3)	1531.1	1531.0	8996.5
SCHOOLS	21432.6	3361.8	21498.8
TOTAL	42123.1	13218.5	44515.0
ALTERNATIVE 4			
GENERAL OBLIGATION BOND ITEMS (2)	5698.5	5825.7	14019.8
REVENUE BOND ITEMS (3)	1531.1	1531.0	8996.5
SCHOOLS	21432.6	3361.8	21498.8
TOTAL	42123.1	13218.5	44515.0
ALTERNATIVE 5			
GENERAL OBLIGATION BOND ITEMS (2)	2171.1	582.2	3141.3
REVENUE BOND ITEMS (3)	1626.1	325.2	2150.3
SCHOOLS	2431.5	522.3	3254.6
TOTAL	6388.9	1530.4	8546.2
ALTERNATIVE 6			
GENERAL OBLIGATION BOND ITEMS (2)	2171.1	582.2	3141.3
REVENUE BOND ITEMS (3)	1626.1	325.2	2150.3
SCHOOLS	2431.5	522.3	3254.6
TOTAL	6388.9	1530.4	8546.2
ALTERNATIVE 7			
GENERAL OBLIGATION BOND ITEMS (2)	0.0	0.0	435.3
REVENUE BOND ITEMS (3)	0.0	0.0	260.9
SCHOOLS	0.0	0.0	345.3
TOTAL	0.0	0.0	1041.3

(1) MAXIMUM ANNUAL INVESTMENT REQUIRED.
(2) GENERAL OBLIGATION BOND ITEMS INCLUDE FIRE, POLICE, PUBLIC WORKS, STREET LIGHTS, PARKS, AND SELECT CONSTRUCTION.
(3) REVENUE BOND ITEMS INCLUDE WATER AND WASTEWATER FACILITY EXPANSIONS.
SOURCE: [illegible], BIAS INC.

The level of capital expenditure requirements estimated in the Iron County area when compared to the reserved bonding capacities of the various jurisdictions indicates the inability of the county, school district or cities to finance the projects necessary to support these levels of infrastructure growth. Alternatives 1, 3, and 4 present situations where the amount of capital expenditures exceed the reserved bonding capacity for the respective jurisdictions. The relatively low tax base in the Iron County area will prevent any financing of large scale infrastructure facilities. The importance of having the infrastructure facilities built and in operation before the population in-migration begins cannot be over-emphasized.

Federal assistance is necessary to maintain anticipated service level demands. While peak year capital expenditure requirements under each alternative are higher than the long-term requirements, temporary facilities and mitigation strategies can reduce these additional costs substantially. Under the remaining alternatives local financing of long-term requirements will be possible, although federal assistance would be required to mitigate the adverse short term impacts.

EFFECTS ON POPULATION AND COMMUNITIES (2.1.4)

The population effects of an operating base near Beryl, Utah, which would be the greatest for Alternatives 3 and 4 when a primary base is proposed, are projected to occur principally within Iron County, although sizable spillovers would be experienced in adjacent Washington and Beaver Counties, Utah, and Lincoln County, Nevada. For Alternative 3, the M-X-related in-migrant population would reach a maximum during the construction "boom" of about 21,600 persons in 1986, an increase of more than 100 percent over the baseline population projected that year. In the long-term, out-migration of construction-related population would reduce the total to a permanent level of about 16,900, 69 percent above the projected baseline. The effects induced by Alternative 1, when a secondary operations base is proposed, are about 25 percent less than for Alternatives 3 and 4, as shown in Table 2.1.4-1.

The construction-related population present in Iron County would total about 4,800 in 1986, about one-fifth of all in-migrants, while the equivalent proportions for military operations, civilian operations, and indirect population are 33 percent, 5 percent, and 39 percent, respectively, as shown in Table 2.1.4-2. The construction-related population, a large share of whom would be workers present without families, would likely have higher incomes, a slightly larger family household size, and younger age distribution than the general population (Mountain West Research, Inc., 1975), while the military-related population would contain a large share of single persons and have a younger age structure and lower average income (at least for enlisted personnel) than the general population. The civilian operations and indirect population generated by project-related expansion of local economic activity would likely approximate the characteristics of the population of the western United States. The construction-related population and indirect populations would be temporarily present in Iron County, and all permanent in-migrants are projected to be related to military and civilian operations employment. About 42 percent of the in-migrants present in the peak year (9,200 persons) would be civilian labor force participants while another 21 percent (4,600 persons) would be school age population. About 16 percent of the 16,900 permanent in-migrants would be civilian labor force participants and another 29 percent would be school age population.

The projected M-X related in-migrant population at the county level has been disaggregated to two spatial categories of residence, the operating base and

Table 2.1.4-1.

PROJECTED BASELINE POPULATION AND CUMULATIVE M-E RELATED IN-MIGRATION BY ALTERNATIVE, IN 1000
ASSUMING TREND BASELINE

ALTERNATIVE / POPULATION	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE POPULATION	18610	18993	19649	20348	20861	21346	21851	22369	22895	23318	23747	24164	24556
PROPOSED ACTION													
M-E IN-MIGRATION	0	0	0	230	1338	1930	2272	1966	1570	1471	1462	1457	1452
TOTAL POPULATION	18610	18993	19649	20578	22199	23276	24123	24335	24465	24789	25209	25621	26008
PERCENT DIFFERENCE FROM BASELINE	0.0	0.0	0.0	1.1	6.4	9.0	9.5	8.8	6.9	6.3	6.2	6.0	5.9
ALTERNATIVE 1													
M-E IN-MIGRATION	0	0	862	3194	9810	15434	17132	17431	14443	12862	12819	12817	12814
TOTAL POPULATION	18610	18993	20511	23542	30671	36780	38983	39800	37338	36156	36586	37001	37390
PERCENT DIFFERENCE FROM BASELINE	0.0	0.0	4.4	15.7	47.0	72.3	78.4	77.9	63.1	55.1	54.1	53.1	52.3
ALTERNATIVE 3													
M-E IN-MIGRATION	3071	7291	13476	19322	21642	20461	20923	19663	17006	16951	16948	16945	16943
TOTAL POPULATION	21681	26284	33125	39670	42503	41807	42774	42032	39899	40265	40695	41102	41499
PERCENT DIFFERENCE FROM BASELINE	16.7	38.4	68.6	95.0	101.7	95.9	95.8	87.9	74.3	72.7	71.4	70.1	69.0
ALTERNATIVE 4													
M-E IN-MIGRATION	3071	7291	13476	19322	21642	20461	20923	19663	17006	16951	16948	16945	16943
TOTAL POPULATION	21681	26284	33125	39670	42503	41807	42774	42032	39899	40265	40695	41102	41499
PERCENT DIFFERENCE FROM BASELINE	16.7	38.4	68.6	95.0	101.7	95.9	95.5	87.9	74.3	72.7	71.4	70.1	69.0
ALTERNATIVE 5													
M-E IN-MIGRATION	33	406	1241	2136	2742	2599	2783	2867	2223	2035	2017	2011	2006
TOTAL POPULATION	18643	19489	20890	22484	23603	23945	24634	25236	25118	25349	25764	26175	26562
PERCENT DIFFERENCE FROM BASELINE	0.2	2.6	6.3	10.5	13.1	12.2	12.7	12.8	9.7	8.7	8.5	8.3	8.2
ALTERNATIVE 6													
M-E IN-MIGRATION	33	406	1241	2136	2742	2599	2783	2867	2223	2035	2017	2011	2006
TOTAL POPULATION	18643	19489	20890	22484	23603	23945	24634	25236	25118	25349	25764	26175	26562
PERCENT DIFFERENCE FROM BASELINE	0.2	2.6	6.3	10.5	13.1	12.2	12.7	12.8	9.7	8.7	8.5	8.3	8.2

SOURCE: HDR SCIENCES, 21-OCT-83

Table 2.1.4-2.

PROJECTED CUMULATIVE POPULATION IN MIGRATION BY PROJECT RELATED EMPLOYMENT CATEGORY,* BY ALTERNATIVE, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE /CATEGORIES	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PROPOSED ACTION													
BASE CONSTRUCTION	0	0	0	6	169	257	177	0	0	0	0	0	0
CLUSTER CONSTRUCTION	0	0	0	21	103	22	0	0	0	0	0	0	0
ASSEMBLY & CHECKOUT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILITARY OPERATIONS	0	0	0	0	302	603	905	1220	1220	1220	1220	1220	1220
CIVILIAN OPERATIONS	0	0	0	0	0	0	0	0	0	0	0	0	0
INDIRECT	0	0	0	203	764	1047	1040	747	351	252	242	237	232
TOTAL	0	0	0	230	1338	1930	2072	1966	1570	1471	1462	1457	1452
ALTERNATIVE 1													
BASE CONSTRUCTION	0	0	0	204	2058	3197	2201	1042	0	0	0	0	0
CLUSTER CONSTRUCTION	0	0	0	79	145	31	0	0	0	0	0	0	0
ASSEMBLY & CHECKOUT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILITARY OPERATIONS	0	0	0	0	2716	5431	8147	10976	10976	10976	10976	10976	10976
CIVILIAN OPERATIONS	0	0	0	0	336	809	1400	1873	1869	1866	1864	1861	1858
INDIRECT	0	0	862	2911	4553	5965	5384	3540	1578	0	0	0	0
TOTAL	0	0	862	3194	9810	15434	17132	17431	14443	12842	12839	12837	12834
ALTERNATIVE 3													
BASE CONSTRUCTION	1736	2768	3623	3129	1812	0	0	0	0	0	0	0	0
CLUSTER CONSTRUCTION	0	0	18	122	143	0	0	0	0	0	0	0	0
ASSEMBLY & CHECKOUT	0	350	900	1800	2850	2850	2800	2650	50	0	0	0	0
MILITARY OPERATIONS	0	0	2376	4809	7242	9618	11994	14370	14370	14370	14370	14370	14370
CIVILIAN OPERATIONS	0	0	344	756	1169	1642	2114	2587	2583	2580	2578	2575	2572
INDIRECT	1334	3973	6215	8707	8426	6351	3981	56	0	0	0	0	0
TOTAL	3071	7091	13476	19322	21642	20461	20893	19663	17004	16951	16948	16945	16943
ALTERNATIVE 4													
BASE CONSTRUCTION	1736	2768	3623	3129	1812	0	0	0	0	0	0	0	0
CLUSTER CONSTRUCTION	0	0	18	122	143	0	0	0	0	0	0	0	0
ASSEMBLY & CHECKOUT	0	350	900	1800	2850	2850	2800	2650	50	0	0	0	0
MILITARY OPERATIONS	0	0	2376	4809	7242	9618	11994	14370	14370	14370	14370	14370	14370
CIVILIAN OPERATIONS	0	0	344	756	1169	1642	2114	2587	2583	2580	2578	2575	2572
INDIRECT	1334	3973	6215	8707	8426	6351	3981	56	0	0	0	0	0
TOTAL	3071	7091	13476	19322	21642	20461	20893	19663	17004	16951	16948	16945	16943
ALTERNATIVE 5													
BASE CONSTRUCTION	93	233	311	278	145	0	0	0	0	0	0	0	0
CLUSTER CONSTRUCTION	0	0	14	94	99	0	0	0	0	0	0	0	0
ASSEMBLY & CHECKOUT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILITARY OPERATIONS	0	0	264	534	805	1069	1333	1597	1597	1597	1597	1597	1597
CIVILIAN OPERATIONS	0	0	0	0	0	0	0	11	7	4	2	0	0
INDIRECT	1	263	752	1297	1693	1530	1447	1259	619	433	419	414	409
TOTAL	97	496	1341	2136	2742	2599	2780	2867	2223	2035	2017	2011	2006
ALTERNATIVE 6													
BASE CONSTRUCTION	93	233	311	278	145	0	0	0	0	0	0	0	0
CLUSTER CONSTRUCTION	0	0	14	94	99	0	0	0	0	0	0	0	0
ASSEMBLY & CHECKOUT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILITARY OPERATIONS	0	0	264	534	805	1069	1333	1597	1597	1597	1597	1597	1597
CIVILIAN OPERATIONS	0	0	0	0	0	0	0	11	7	4	2	0	0
INDIRECT	1	263	752	1297	1693	1530	1447	1259	619	433	419	414	409
TOTAL	97	496	1341	2136	2742	2599	2780	2867	2223	2035	2017	2011	2006

*EMPLOYMENT CATEGORY IS FOR PRIMARY WORKER IN HOUSEHOLD. SOURCE: HDR SCIENCES, 1 NOV 80

communities, with a portion of the transient construction population housed in temporary facilities on the base. In 1986, the peak year, about 43 percent (9,200 persons) of the in-migrant population would be housed on the base, with the remaining 57 percent (12,400) requiring accommodation in local communities. In the long-term approximately 5,400 persons, about one-third of the project-related population, are projected to reside in the Iron County's communities (Table 2.1.4-3). The population generated within Iron County by the proposed base near Beryl is most likely to be accommodated in new development near the base site and in the Cedar City area and the Newcastle community.

Population effects from a base near Beryl would also be experienced in nearby Washington, Beaver, and Lincoln counties, which are projected to have approximately 1,200, 1,300, and 400 permanent in-migrants, respectively. These are most likely to be accommodated in the communities of Enterprise (Washington Co.), Milford and Minersville (Beaver Co.) and Pioche-Panoca (Lincoln Co.).

EFFECTS ON LAND USE (2.1.5)

Community Land Use

Beryl and the surrounding communities in Iron County, Utah, will receive long-term urban land impacts from six to eight Nevada/Utah deployment alternatives. Of the two remaining alternatives, Iron County will be subject to temporary urban land impacts from construction activity. Table 2.1.5-1 provides land requirements for urban land uses in Iron County. Under Alternatives 3 and 4, and OB I will be located at Beryl while Alternative 1 proposed an OB II at Beryl.

Alternatives 3 and 4

Alternatives 3 and 4 have the largest urban land requirements over the span of the project. Peak year demands will be 1,870 acres. Land for housing (967 acres) is the largest land use category and of this category mobile homes will use about two-thirds of the land area. The peak demands of the construction period have a duration of five years ending in 1989. At this time the lower requirements, approximately 894 acres, of the operation period are reached. Housing is still the largest land use, however the proportion of mobile homes to permanent housing is reversed with permanent housing now occupying the larger percentage (84 percent) of the land for housing.

Impacts on Availability of Land

Land available to meet the project requirements and the impacts of the project on the community size and vacant land is provided in Table 2.1.5-2. It is evident that after meeting the peak year requirements over 3,000 acres or 38 percent of the urban land would still remain vacant. It is likely that Cedar City, as the largest city in Iron County, would receive the major portion of the demand for urban land. Vacant urban land within Cedar City is currently over 2,600 acres and hence the peak year countywide demand of 1,870 acres could be met by Cedar City alone. Such an occurrence is unlikely since the peak demand will probably not be met by the development of permanent facilities but rather a large amount of overcrowding of permanent facilities.

Newcastle and Modena as the closest communities in Iron County to Beryl are also likely to receive a large portion of the peak period growth. These small

Table 2.1.4-3.

PROJECTED CUMULATIVE POPULATION IN MIGRATION BY PLACE OF RESIDENCE, BY ALTERNATIVE, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / PLACE OF RESIDENCE	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PROPOSED ACTION													
CONSTRUCTION CAMPS	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS BASE	0	0	0	0	0	0	0	0	0	0	0	0	0
LOCAL COMMUNITIES	0	0	0	230	1038	1930	2072	1966	1570	1471	1462	1457	1452
TOTAL	0	0	0	230	1038	1930	2072	1966	1570	1471	1462	1457	1452
ALTERNATIVE 1													
CONSTRUCTION CAMPS	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS BASE	0	0	0	63	2810	5332	7203	9115	8781	8781	8781	8781	8781
LOCAL COMMUNITIES	0	0	862	3130	7000	10102	9929	8315	5663	4062	4059	4056	4053
TOTAL	0	0	862	3194	9810	15434	17132	17431	14443	12842	12839	12837	12834
ALTERNATIVE 3													
CONSTRUCTION CAMPS	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS BASE	542	1266	3916	6611	9206	10544	12395	14146	11546	11496	11496	11496	11496
LOCAL COMMUNITIES	2529	6025	9560	12712	12436	9916	8497	5517	5457	5455	5452	5449	5446
TOTAL	3071	7291	13476	19322	21642	20461	20893	19663	17004	16951	16948	16945	16943
ALTERNATIVE 4													
CONSTRUCTION CAMPS	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS BASE	542	1266	3916	6611	9206	10544	12395	14146	11546	11496	11496	11496	11496
LOCAL COMMUNITIES	2529	6025	9560	12712	12436	9916	8497	5517	5457	5455	5452	5449	5446
TOTAL	3071	7291	13476	19322	21642	20461	20893	19663	17004	16951	16948	16945	16943
ALTERNATIVE 5													
CONSTRUCTION CAMPS	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS BASE	0	0	0	0	0	0	0	0	0	0	0	0	0
LOCAL COMMUNITIES	97	496	1241	2136	2742	2599	2780	2867	2223	2035	2017	2011	2006
TOTAL	97	496	1241	2136	2742	2599	2780	2867	2223	2035	2017	2011	2006
ALTERNATIVE 6													
CONSTRUCTION CAMPS	0	0	0	0	0	0	0	0	0	0	0	0	0
OPERATIONS BASE	0	0	0	0	0	0	0	0	0	0	0	0	0
LOCAL COMMUNITIES	97	496	1241	2136	2742	2599	2780	2867	2223	2035	2017	2011	2006
TOTAL	97	496	1241	2136	2742	2599	2780	2867	2223	2035	2017	2011	2006

SOURCE: HDR SCIENCE/... 1 NOV 80

Table 2.1.5-1.

CUMULATIVE M X RELATED LAND REQUIREMENTS (ACRES) BY USE CATEGORY, BY ALTERNATIVE IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / LAND USE CATEGORY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PROPOSED ACTION													
PERMANENT HOMES	0	0	0	4	25	49	60	79	86	97	106	105	105
MOBILE HOMES	0	0	0	14	72	94	95	72	38	25	19	19	19
SUBTOTAL	0	0	0	18	97	143	155	151	124	122	125	124	124
RETAIL/COMM /INDUS	0	0	0	3	8	10	10	8	5	5	5	5	5
STS AND HWYS	0	0	0	11	64	94	99	93	75	70	72	71	71
PUBLIC/INSTITUTIONAL	0	0	0	3	27	33	34	34	28	26	26	26	26
TOTAL	0	0	0	34	190	280	298	286	232	223	228	226	226
ALTERNATIVE 1													
PERMANENT HOMES	0	0	14	52	138	260	386	336	330	284	307	307	307
MOBILE HOMES	0	0	52	184	375	501	472	325	146	70	56	56	56
SUBTOTAL	0	0	66	236	513	761	758	661	476	354	363	363	363
RETAIL/COMM /INDUS	0	0	4	15	35	52	54	51	38	28	26	26	26
STS AND HWYS	0	0	45	159	341	496	491	416	287	207	208	208	208
PUBLIC/INSTITUTIONAL	0	0	12	46	112	162	159	133	90	67	67	66	66
TOTAL	0	0	127	456	1002	1471	1462	1261	891	656	664	663	663
ALTERNATIVE 3													
PERMANENT HOMES	50	125	196	315	330	396	494	387	415	414	414	414	414
MOBILE HOMES	130	312	503	652	626	409	228	95	75	75	75	75	75
SUBTOTAL	180	437	699	967	956	805	722	482	490	489	489	489	489
RETAIL/COMM /INDUS	13	31	51	70	70	68	66	58	36	35	35	35	35
STS AND HWYS	118	291	465	633	623	507	437	282	282	282	282	281	281
PUBLIC/INSTITUTIONAL	43	98	154	201	193	151	132	91	90	89	89	89	89
TOTAL	353	857	1370	1870	1850	1530	1357	914	898	895	895	894	894
ALTERNATIVE 4													
PERMANENT HOMES	50	125	196	315	330	396	494	387	415	414	414	414	414
MOBILE HOMES	130	312	503	652	626	409	228	95	75	75	75	75	75
SUBTOTAL	180	437	699	967	956	805	722	482	490	489	489	489	489
RETAIL/COMM /INDUS	13	31	51	70	70	68	66	58	36	35	35	35	35
STS AND HWYS	118	291	465	633	623	507	437	282	282	282	282	281	281
PUBLIC/INSTITUTIONAL	43	98	154	201	193	151	132	91	90	89	89	89	89
TOTAL	353	857	1370	1870	1850	1530	1357	914	898	895	895	894	894
ALTERNATIVE 5													
PERMANENT HOMES	2	11	27	50	72	101	155	193	164	147	146	146	145
MOBILE HOMES	4	24	63	107	135	103	73	54	30	27	27	27	26
SUBTOTAL	6	35	90	159	207	204	228	247	194	174	173	173	171
RETAIL/COMM /INDUS	3	5	8	12	13	9	9	9	7	7	7	7	7
STS AND HWYS	5	24	59	104	135	130	130	146	112	101	98	98	98
PUBLIC/INSTITUTIONAL	1	8	21	35	45	41	46	48	38	36	36	36	36
TOTAL	15	72	177	310	399	384	421	449	350	317	314	313	313
ALTERNATIVE 6													
PERMANENT HOMES	2	11	27	50	72	101	155	193	164	147	146	146	145
MOBILE HOMES	4	24	63	107	135	103	73	54	30	27	27	27	26
SUBTOTAL	6	35	90	159	207	204	228	247	194	174	173	173	171
RETAIL/COMM /INDUS	3	5	8	12	13	9	9	9	7	7	7	7	7
STS AND HWYS	5	24	59	104	135	130	130	146	112	101	98	98	98
PUBLIC/INSTITUTIONAL	1	8	21	35	45	41	46	48	38	36	36	36	36
TOTAL	15	72	177	310	399	384	421	449	350	317	314	313	313

SOURCE: HDR SCIENCES, 1 NOV 80

Table 2.1.5-2. M-X urban land requirements and impacts, Iron County.

ALTERNATIVE* (TYPE OF FACILITY)	CURRENT URBAN LAND**			PEAK YEAR				LONG TERM			
				LAND REQUIREMENT		PROJECTED VACANT LAND		LAND REQUIREMENT		PROJECTED VACANT LAND	
	VACANT (ACRES)	DEVELOPED (ACRES)	TOTAL (ACRES)	ACRES	% OF DEVELOPED LAND	ACRES	% OF TOTAL URBAN LAND	ACRES	% OF DEVELOPED LAND	ACRES	% OF TOTAL URBAN LAND
3, 4 (OB I)	4,961	3,160	8,121	1,871	59.2%	3,090	38.0%	894	28.3%	4,067	50.1%
1 (OB II)	4,961	3,160	8,121	1,471	46.6%	3,490	43.0%	663	21.0%	4,298	52.9%
5, 6 (Construction Camp)	4,961	3,160	8,121	449	14.2%	4,512	55.6%	313	9.9%	4,618	57.2%

38479

*Only representative alternatives are listed.

**Includes land within existing incorporated and unincorporated communities.

Source: Five-County Association, 1978.

communities serve rural populations and have high percentages of vacant land within the areas covered by the Iron County Master Plan. However, the absolute number of vacant acres are low relative to the peak year requirements. For example, Newcastle had 156 acres of vacant land in 1978. The peak year impacts upon the availability of land within these individual communities will be significant without expansion of the communities. Since the surrounding land is vacant or in agricultural use expansion of the urban area is not limited by an absence of developable land. Amendment to the Master Plan would enable the communities to have sufficient land for the growth. An additional problem needing rectification prior to growth is the water supply system in both communities. Neither system has received approval from the Utah State Health Department.

The potential for a significant share of the urban land requirements being satisfied by a scattering of mobile homes and urban uses outside of the present communities in Iron County is also a likely possibility. The degree to which this could take place is dependent upon the stringency and enforcement of the county ordinances such as the zoning code and subdivision regulations.

Enterprise in Washington County is approximately 24 mi south of Beryl and is expected to receive the major share of the Washington County impacts. Peak year requirements in Washington County are 311 acres while Enterprise currently has approximately 570 vacant acres. As such the peak year requirements would demand about half of the vacant land in Enterprise, leaving a sufficient quantity available for ongoing in Enterprise. St. George in Washington County is not anticipated to be subject to any significant urban land use impacts of an OB in Beryl because of its distance and being an impassable route during the winter on the road from Beryl.

In Beaver County, Milford and Minersville are expected to receive spillover effects during the peak period. Minersville as the larger of the two towns would receive the greater portion of the countywide 430 acre requirement. Vacant land in these two communities totaled 434 acres in 1978 and hence the peak requirements would use the entire amount. Such an event would have adverse impacts upon the baseline growth and land values in the towns. However, if Minersville and Milford extend their urban boundaries and open up additional land for urban development these adverse impacts can be avoided.

Spillover demands for urban land are also anticipated to extend into Pioche, Panaca and Caliente in Lincoln County, Nevada. Under Alternative 3 the spillover effects into Lincoln County would result in demand for over 400 acres. The capacity for Pioche and Panaca to accommodate this demand is undetermined at this time. It is expected that the communities would be able to extend their boundaries to handle the additional growth.

The long term demand for urban land is likely to impact the same communities in Iron, Washington, Beaver, and Lincoln counties. Iron County on a countywide basis has sufficient capacity to handle the long-term demands from Alternatives 3 and 4. After the development of the long-term and areas approximately one-half of the current urban land would still be vacant and available for baseline development. On a community by community basis, Cedar City currently has sufficient vacant land to accommodate long-term project requirements in addition to ongoing growth. In Modena and Newcastle, expansion into the surrounding vacant areas as noted above may be necessary in order to accommodate the long-term demands.

The long-term requirements on Enterprise in Washington County will amount to about two-thirds of the peak period demands. Enterprise has not been experiencing significant ongoing growth pressures and hence the ong-term land requirements will not conflict with baseline growth opportunities. Beaver County requirements will also be about two-thirds of peak demands. Sufficient land should still be available in the Beaver County communities for baseline growth after satisfying the long-term demands. Demands on the communities in eastern Lincoln County will decrease by 88 percent and should not be significant.

Other Impacts

The peak period of growth will increase the size of the communities in Iron County by about 60 percent. Since this change will take place over only three year, the ability of the communities to guide the growth in a desirable and efficient manner will be minimal. As a result it can be expected that numerous conflicting land uses, "leapfrog" developments, and other symptoms of poor planning will emerge. The conclusion of the construction period may bring in problems of returning land used for temporary structures to former land uses as well as the removal of abandoned structures. The periods of growth and departure will cause great fluctuations in property values. In addition the character of the communities will undergo significant changes due to the construction of numerous temporary structures and abbreviated periods for design review of development proposals.

Alternative 1

Alternative 1 with an OB II at Beryl has peak land requirements about 20 percent and long-term requirements 25 percent less than the OB I alternatives. The reduction in the land requirements does not substantially alter the impacts as described above for Iron County. While the proportion of the decreased requirements varies in Washington, Beaver, and Lincoln counties, the impacts do not change substantially from those noted above.

Proposed Action and Alternatives 2, 5, 6, and 8

The community land requirements drop significantly when an OB is not proposed for Beryl as is the case for the Proposed Action and Alternatives 2, 5, 6, and 8. The difference in peak year requirements varies from 3 percent (Alternative 8) to 24 percent (Alternatives 5 and 6) of the requirements for Alternatives 3 and 4. The long-term requirements range from no long-term needs to 35 percent of the Alternative 3 and 4 needs.

Conclusion

The peak period impacts on the countywide availability of urban land resulting from an OB I are not significant in Iron County. However, impacts on individual communities may exceed the current supply of land for urban uses. Rectification of this problem can be obtained by expanding the supply through amendments to the Master Plan. Comparable impacts on community land availability in Washington County would not be significant. However, the requirements on Milford and Minersville in Beaver County would exceed the supply of land. Long term impacts of an OB I may result in the need for boundary changes or master plan amendments as noted above. Rapid growth induced by an OB I or OB II would have adverse impacts upon planning efforts in all of the communities.

Rural Land Use

This section will discuss two types of land uses that could be affected by a potential operating base at Beryl, Utah. They are: agricultural and recreation.

Agriculture

Table 2.1.5-3 shows the number of acres of each type of cropland that would be occupied by the potential base facilities, and the number of acres of each cropland type within the suitability zone around the potential base.

It can be seen that the operating base would occupy no existing cropland. However, 1,966 acres of the suitability zone is in existing irrigated agriculture, and is equal to 9.3 percent of that area. Ample area exists within the zone to relocate the base within the zone without having to use irrigated cropland.

Because of its proximity to the potential operating base, the croplands in lower Escalante Valley could be subject to pressure for private urban development unless laws protecting such farmland are adopted and enforced by the county.

Effects on Recreation

No fishing, hunting or other recreational sites are located within the suitability envelope of the operating base (Figure 2.1.5-1). Dispersed recreation such as rock collecting, small game hunting and ORV use will be restricted in the immediate vicinity of the OB. At the present time dispersed recreation is rather limited on the site.

The M-X induced in-migration will produce a concomitant increase in demand and use of recreation sites in the OB vicinity. Assuming the first base at Beryl (Alternatives 3 & 4), the peak year 1986 will have an M-X induced in-migration of 22,599 persons or 104 percent over baseline projections. There will be a subsequent decrease to 17,569 or 79 percent over baseline by 1993. According to the indirect effect index analyses (Section 2.1), by 1994 those recreational sites expected to receive the greatest M-X-related demand increase include: Zion and Bryce Canyon National Parks, Cedar Breaks National Monument, campgrounds on the western section of the Dixie National Forest, Beaver Dam, Cathedral Gorge, Snow Canyon, Echo Canyon State Parks and Enterprise and Minersville Lakes.

Camping and picnicking facilities appear to be in good supply in those areas east and south of the Beryl site. Approximately 70 percent of the camping activity in this region is done by residents of the region. The remaining 30 percent are from either other regions of Utah or out of state. At present Pine Park, Enterprise Reservoir, and Pine Valley are well below their theoretical capacity. With increased demand associated with M-X, these sites may be upgraded to the level of a "well managed site" (U.S.F.S. 1979).

There appears to be an adequate supply of water-related recreational facilities in the region with four lakes. At present Enterprise Lake would be the only one underutilized. Utah SCORP (1978 draft) indicates a need of facility improvements at various sites; M-X demand may require further improvements.

Table 2.1.5-3. Cropland use at potential operating base facilities at Beryl.

CROPLAND TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT OF OB	ACRES	PERCENT OF ZONE
Irrigated	0	0	1,000	0.3
Dry	0	0	0	0
Total	0	0	1,000	0.3

3861

Source: Iron County, 1972.

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M-X ENVIRONMENTAL TECHNICAL REPORT. ALTERNATIVE POTENTIAL OPERA--ETC(U
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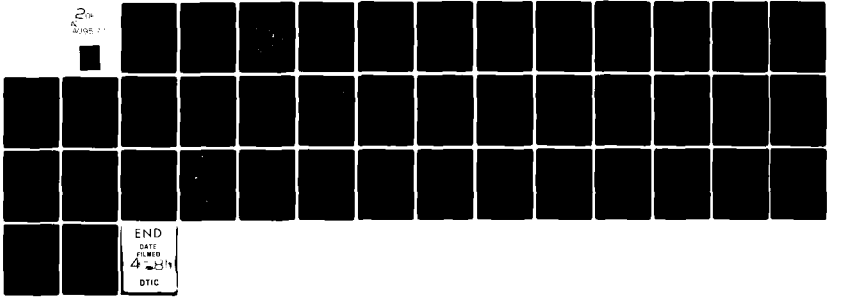
UNCLASSIFIED M-X-ETR-6 AFSC-TR-81-21 NL



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(See Chapter 4 of the DEIS, Figure 4.3.2.12-17)

Figure 2.1.5-1. The area of most intensive recreational influence around the proposed Beryl OB site.

Utah SCORP identifies a need of picnic tables in this area (5,000 added tables). M-X related population growth would add to this need.

EFFECTS ON LAND OWNERSHIP (2.1.6)

Beryl, Utah

Figure 2.1.6-1 shows the potential operating base at Beryl, Utah, and the land ownerships in the area. Table 2.1.6-1 shows the number of acres of land of each ownership type that would be occupied by the potential operating base and facilities, and the number of acres of each ownership type within the suitability zone around the potential base.

It can be seen that 54 percent of the area of the operating base facilities would be located on BLM land, 38 percent on private land, and the remainder on state land. Because the suitability zone extends southerly into the private land of Escalante Valley, 62 percent of the zone is in private ownership and 31 percent is BLM land with the remainder being state land.

Because of the mountainous character of most of the BLM land within the suitability zone, it is unlikely that the operating base could be relocated to take additional advantage of BLM land. The 3,200 acres of private land for an operating base at Beryl is equal to 0.4 percent of the private land in Iron County. This would be a very low impact on that resource.

EFFECTS ON HOUSING (2.1.7)

The alternatives that most affect Iron County are 1, 3, and 4 when one of the two operating bases is near Beryl: Operating Base II in the case of Alternative 1; and Operating Base I, in the case of Alternatives 3 and 4. For the latter two, the housing requirements are identical, peaking at 4,541 units in 1985, and consisting of 800 single-family, 483 multi-family, and 3,285 mobile homes (Table 2.1.7-1), and with large annual requirements in both 1983 and 1984. After the peak-year, the housing needs decline and then drop rapidly in 1987 and then again in 1989, to level-off at around 1,880 units in the early 1990's, and reaching a long-term need for 1,127 single-family units, 376 multi-family units, and 376 mobile homes in 1994. The large difference between peak-year and long-term needs, will mean large surpluses of housing units, mostly mobile homes, thus minimizing the adverse impacts since they are movable and can be used in meeting M-X-related requirements elsewhere, or, indeed, could be used to help satisfy the normal growth baseline requirements in Iron County.

With the OB II near Beryl, as in Alternative 1, the peak housing requirements come in 1987 when 3,558 units are called for, consisting of 664 single-family units, 388 multi-family units, and 2,507 mobile homes. Afterwards, requirements fall-off, particularly in 1990, to reach a steady-state long-term level of 1,395 units, comprised of 837 single-family, 279 multi-family, and 279 mobile homes.

Other alternatives will still have impacts on Iron County even though an OB is not located in the county. For example, under Alternatives 5 and 6, when OB I is scheduled to be near Milford in Beaver County, and under the Proposed Action, when OB II is located near Milford, then Iron County is expected to experience long-term

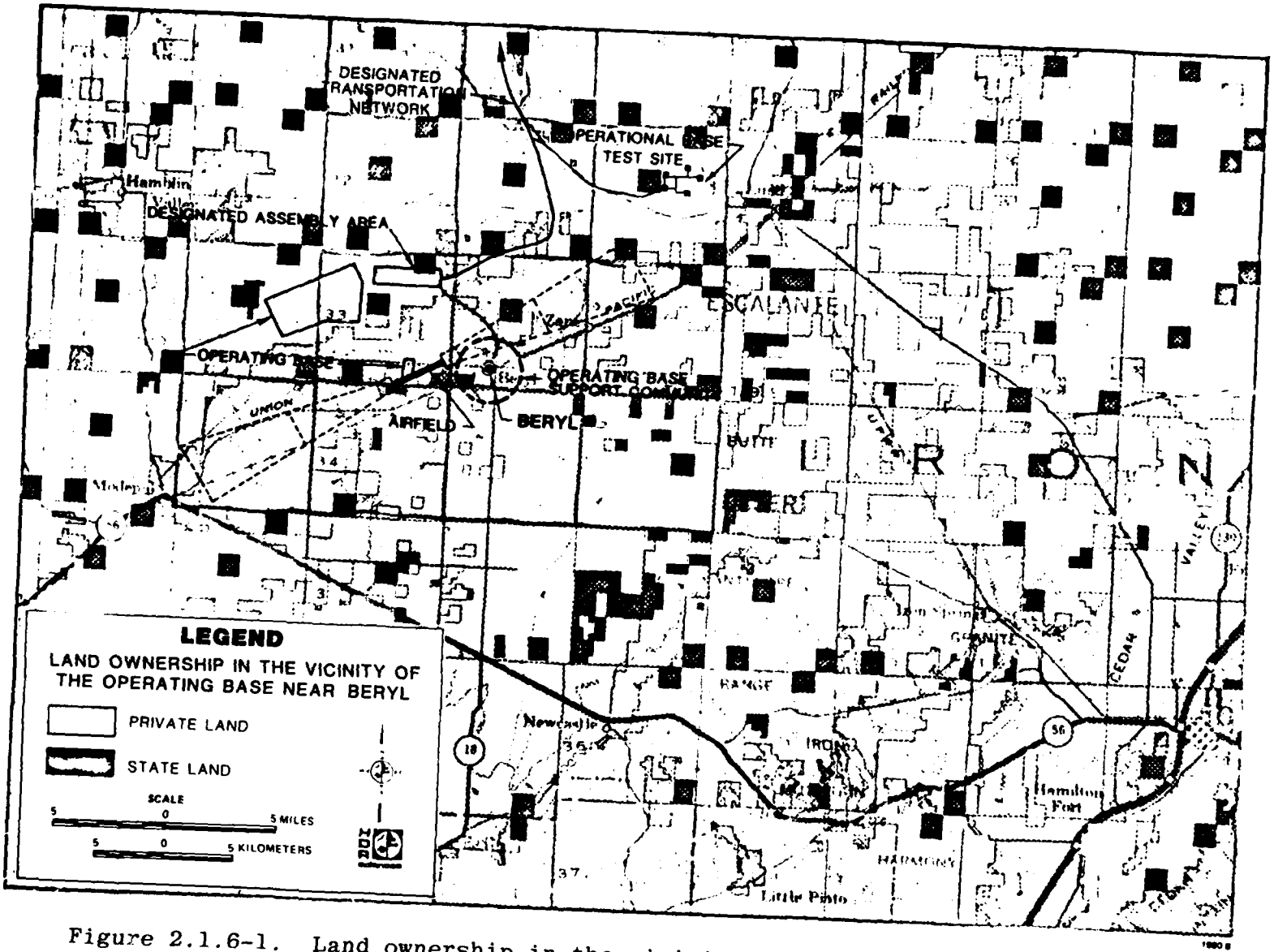

Figure 2.1.6-1. Land ownership in the vicinity of the OB near Beryl.

Table 2.1.6-1. Land ownership at potential operating base facilities at Beryl, Utah.

OWNERSHIP TYPE	OPERATING BASE FACILITIES		SUITABILITY ZONE	
	ACRES	PERCENT OF OB	ACRES	PERCENT OF ZONE
Private	3,200	38	181,760	62
State	640	8	21,760	7
BLM	4,500	54	91,520	31
Total	8,340	100	295,040	100

3854

Source: Department of Interior, 1977.

Table 2.1.7-1.

CUMULATIVE M-X RELATED HOUSING UNIT REQUIREMENTS IN LOCAL COMMUNITIES BY HOUSING TYPE, BY ALTERNATIVE, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / HOUSING TYPE	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE REQUIREMENTS	5770	5953	6158	6377	6538	6690	6848	7011	7176	7307	7443	7573	7696
PROPOSED ACTION													
SINGLE FAMILY UNITS	0	0	0	8	61	126	154	206	227	261	287	286	285
MULTI-FAMILY UNITS	0	0	0	8	46	70	88	100	104	97	96	95	95
MOBILE HOMES	0	0	0	68	358	472	474	362	189	125	96	95	95
TOTAL M-X RELATED	0	0	0	84	464	668	716	668	520	483	479	477	475
M-X PLUS BASELINE	5770	5953	6158	6461	7002	7358	7564	7679	7696	7790	7922	8050	8171
ALTERNATIVE 1													
SINGLE FAMILY UNITS	0	0	32	120	337	664	729	875	869	769	838	838	837
MULTI-FAMILY UNITS	0	0	32	115	265	388	427	441	400	280	279	279	279
MOBILE HOMES	0	0	259	922	1875	2507	2361	1624	729	350	279	279	279
TOTAL M-X RELATED	0	0	323	1157	2477	3558	3517	2941	1999	1398	1397	1396	1395
M-X PLUS BASELINE	5770	5953	6481	7534	9015	10248	10365	9952	9175	8705	8840	8969	9091
ALTERNATIVE 3													
SINGLE FAMILY UNITS	122	303	477	800	837	1025	1298	1047	1130	1129	1129	1128	1127
MULTI-FAMILY UNITS	86	241	374	483	507	541	610	381	377	376	376	376	376
MOBILE HOMES	651	1561	2517	3258	3132	2043	1142	477	377	376	376	376	376
TOTAL M-X RELATED	858	2105	3369	4541	4477	3610	3050	1906	1883	1882	1881	1880	1879
M-X PLUS BASELINE	6628	8058	9527	10918	11015	10300	9898	8917	9059	9189	9324	9453	9575
ALTERNATIVE 4													
SINGLE FAMILY UNITS	122	303	477	800	837	1025	1298	1047	1130	1129	1129	1128	1127
MULTI-FAMILY UNITS	86	241	374	483	507	541	610	381	377	376	376	376	376
MOBILE HOMES	651	1561	2517	3258	3132	2043	1142	477	377	376	376	376	376
TOTAL M-X RELATED	858	2105	3369	4541	4477	3610	3050	1906	1883	1882	1881	1880	1879
M-X PLUS BASELINE	6628	8058	9527	10918	11015	10300	9898	8917	9059	9189	9324	9453	9575
ALTERNATIVE 5													
SINGLE FAMILY UNITS	6	27	65	132	183	262	408	518	446	403	400	398	397
MULTI-FAMILY UNITS	3	20	47	76	108	137	193	197	149	134	133	133	132
MOBILE HOMES	20	121	315	534	673	514	363	270	149	134	133	133	132
TOTAL M-X RELATED	29	169	426	742	964	914	967	984	743	672	666	663	662
M-X PLUS BASELINE	5799	6122	6584	7119	7502	7604	7815	7995	7919	7979	8109	8236	8358
ALTERNATIVE 6													
SINGLE FAMILY UNITS	6	27	65	132	183	262	408	518	446	403	400	398	397
MULTI-FAMILY UNITS	3	20	47	76	108	137	193	197	149	134	133	133	132
MOBILE HOMES	20	121	315	534	673	514	363	270	149	134	133	133	132
TOTAL M-X RELATED	29	169	426	742	964	914	967	984	743	672	666	663	662
M-X PLUS BASELINE	5799	6122	6584	7119	7502	7604	7815	7995	7919	7979	8109	8236	8358

spillover effects that might be as much as one-third of the effects when an OB is actually located in the county. For instance, under Alternatives 5 and 6, the long-term M-X-related housing requirements reach 662 units, some 35 percent of those under Alternatives 3 and 4. Similarly, under the Proposed Action the permanent housing requirements are about 25 percent of those when an operating base is actually in Iron County. The other two alternatives, 2 and 8, only affect Iron County temporarily.

With OB I near Beryl, in Alternatives 3 and 4, there will also be spillover effects from Beryl, which in the long-term are likely to produce housing requirements of some 435 mobile homes in Beaver County, some 421 housing units (252 single-family units, 84 multi-family units, and 84 mobile homes) in Washington County, and also some mobile homes in Lincoln County. Under Alternative 1, when OB II is located near Beryl, Beaver and Washington County's long-term housing requirements will be identical at a total of some 319 units (192 single-family, 64 multi-family, and 64 mobile homes). Lincoln County is also likely to experience some spillover effects.

EFFECTS ON COMMUNITY INFRASTRUCTURE (2.1.8)

M-X deployment Alternatives 1, 3 and 4 identify a potential operating base location in the vicinity of Beryl (Iron County), Utah. Construction of such a facility would result in the in-migration of construction workers and their families in the short-term, as well as long-term base personnel. This population in-migration will place additional demands on community infrastructure necessitating the recruitment of more teachers, health care personnel, law enforcement and fire personnel. There will also be impacts on parks and recreation and on basic utilities such as water and solid waste disposal, creating the need for expanded or new facilities. The accommodation of M-X related needs for community services will be fulfilled primarily by Iron County. Neighboring counties, for the most part, will experience lesser demands of a temporary nature. For that reason the following discussion will concentrate upon the effects likely to be experienced in Iron County under Alternatives 1, 3 and 4.

Education

Iron County School District, which currently maintains an enrollment capacity of approximately 4,100 is expected to experience enrollment demands in excess of capacity under projected normal growth conditions prior to 1982. This indicates what any additional enrollment demands attributably to M-X would result in stresses to the local educational system above the level which would occur under normal growth conditions. Under M-X deployment Alternatives 1, 3, and 4, an operating base near Beryl would be located within the jurisdiction of this school district. Population in-migration associated with base construction would occur by 1982 under Alternatives 3 and 4, and somewhat later (1984) under Alternative 1.

Table 2.1.8-1 presents the number of school-aged children expected by grade group for each M-X alternative between the years 1982 and 1994 on an annual basis. As indicated, in 1982, Alternatives 3 and 4 may each add up to 680 additional pupils to the school district, an increase of approximately 14.0 percent over the 4,790 enrollments expected under baseline growth conditions. Alternative 1, however, would add enrollments constituting only a 3.4 percent increase over the baseline

Table 2.1.8-1.

PROJECTED BASELINE AND M-X INDUCED SCHOOL ENROLLMENTS BY GRADE LEVEL, BY ALTERNATIVE, IN IRON ASSURING TREND BASELINE

ALTERNATIVE / NUMBER PUPILS BY GRADE LEVEL	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE ENROLLMENTS	4786	4938	5108	5290	5423	5549	5681	5815	5952	6061	6174	6282	6384
PROPOSED ACTION													
K-6	0	0	0	25	169	244	263	259	270	210	209	200	200
7-9	0	0	0	13	85	132	132	130	110	105	104	104	104
10-12	0	0	0	13	85	122	132	130	110	105	104	104	104
TOTAL M-X RELATED	0	0	0	50	339	489	526	519	439	419	417	416	415
M-X PLUS BASELINE	4786	4938	5108	5340	5762	6038	6207	6334	6391	6480	6591	6670	6799
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	0 0	0 9	6 3	8 8	9 3	8 9	7 4	6 9	6 8	6 6	6 5
ALTERNATIVE 1													
K-6	0	0	87	330	1172	1808	2174	2325	2007	1846	1846	1846	1846
7-9	0	0	43	165	586	944	1087	1162	1004	923	923	923	923
10-12	0	0	43	165	586	944	1087	1162	1004	923	923	923	923
TOTAL M-X RELATED	0	0	173	660	2344	3776	4348	4649	4014	3693	3692	3692	3691
M-X PLUS BASELINE	4786	4938	5281	5950	7767	9325	10029	10464	9966	9754	9866	9974	10075
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	3 4	12 5	43 2	68 0	76 5	79 9	67 4	60 9	59 8	58 8	57 8
ALTERNATIVE 3													
K-6	340	793	1454	2072	2298	2256	2425	2437	2431	2431	2431	2430	2430
7-9	170	377	727	1036	1149	1128	1213	1219	1216	1215	1215	1215	1215
10-12	170	377	727	1036	1149	1128	1213	1219	1216	1215	1215	1215	1215
TOTAL M-X RELATED	680	1506	2907	4144	4597	4513	4851	4875	4863	4862	4862	4861	4860
M-X PLUS BASELINE	5466	6444	8015	9434	10020	10062	10532	10690	10815	10923	11036	11143	11244
PERCENT DIFFERENCE FROM BASELINE	14 2	30 5	56 9	78 3	84 8	81 3	85 4	83 8	81 7	80 2	78 7	77 4	76 1
ALTERNATIVE 4													
K-6	340	793	1454	2072	2298	2256	2425	2437	2431	2431	2431	2430	2430
7-9	170	377	727	1036	1149	1128	1213	1219	1216	1215	1215	1215	1215
10-12	170	377	727	1036	1149	1128	1213	1219	1216	1215	1215	1215	1215
TOTAL M-X RELATED	680	1506	2907	4144	4597	4513	4851	4875	4863	4862	4862	4861	4860
M-X PLUS BASELINE	5466	6444	8015	9434	10020	10062	10532	10690	10815	10923	11036	11143	11244
PERCENT DIFFERENCE FROM BASELINE	14 2	30 5	56 9	78 3	84 8	81 3	85 4	83 8	81 7	80 2	78 7	77 4	76 1
ALTERNATIVE 5													
K-6	16	67	161	268	334	315	347	369	304	285	284	283	282
7-9	8	33	81	134	167	158	173	184	152	143	142	141	141
10-12	8	33	81	134	167	158	173	184	152	143	142	141	141
TOTAL M-X RELATED	33	133	323	537	668	630	694	738	608	571	567	565	563
M-X PLUS BASELINE	4819	5071	5431	5827	6091	6179	6375	6553	6560	6633	6741	6848	6947
PERCENT DIFFERENCE FROM BASELINE	0 7	2 7	6 3	10 2	12 3	11 4	12 2	12 7	10 2	9 4	9 2	9 0	8 8
ALTERNATIVE 6													
K-6	16	67	161	268	334	315	347	369	304	285	284	283	282
7-9	8	33	81	134	167	158	173	184	152	143	142	141	141
10-12	8	33	81	134	167	158	173	184	152	143	142	141	141
TOTAL M-X RELATED	33	133	323	537	668	630	694	738	608	571	567	565	563
M-X PLUS BASELINE	4819	5071	5431	5827	6091	6179	6375	6553	6560	6633	6741	6848	6947
PERCENT DIFFERENCE FROM BASELINE	0 7	2 7	6 3	10 2	12 3	11 4	12 2	12 7	10 2	9 4	9 2	9 0	8 8

SOURCE: IRR SCIENCES, 1 NOV-80

enrollments of 5,100 at the initial year of M-X - related population in-migration, 1984. By 1989, the year of peak enrollment growth attributable to M-X, the percentage increase over baseline growth for Alternatives 1, 3 and 4 may range between approximately 80.0 (Alternative 1) and 84.0 percent (Alternatives 3 and 4) over the 5,815 enrollments expected under normal growth conditions.

Subsequent to peak year enrollment demands resulting from M-X, enrollment levels can be expected to stabilize, the level of which may be useful for long-range educational planning purposes. Table 2.1.8-1 indicates that the Iron County School District may have to provide long-term educational services for between 10,100 (Alternative 1) and 11,240 pupils (Alternatives 3 and 4) should an M-X operating base be located near Beryl. Approximately 6,400 of this total would be attributable to normal enrollment growth in the county. Should no operating base be located in Iron County, the school district would still receive additional demands for services as a result of spillover effects of technical facility construction in adjacent counties. The short and long-term effects of these enrollment demands under Alternatives 2, 5, 6, 8 and the Proposed Action would be considerably less than under Alternatives 1, 3, and 4. Regardless of which M-X deployment alternative is selected, it is evident that given the posture of existing facility inadequacy to meet even the projected number of baseline enrollments expected for the areas that M-X related enrollments will certainly accentuate the need for additional facilities and personnel.

Table 2.1.8-2 indicates the number of teachers which may be required to accommodate baseline and M-X-related enrollment demand on a grade group basis for all years between 1982 and 1994. As was the case with enrollments, Alternatives 1, 3, and 4 will require the largest number of teachers. Alternative 1 may initially require seven additional teachers to accommodate M-X-related enrollment increases in 1984, necessitate nearly 200 by 1989, and require approximately 120 to accommodate long-term demands. Alternatives 3 and 4 may require an additional 30 teachers to accommodate initial M-X-related enrollment increases in 1982. However, by 1989 it is estimated that a little more than 200 teachers may be required to service M-X-related demands, a staffing level that is anticipated to remain fairly constant over the long-term. This brings the total long-term teacher requirement to approximately 490 when combining M-X-related teachers required with those which would be required to accommodate baseline enrollment levels. It is likely that the school district may experience difficulty in attracting and retaining an adequate staffing level.

The proportion of total enrollments and teachers required attributable to other projects in the area when compared to those attributable to M-X plus baseline growth is extremely low. For example, under Alternatives 3 and 4, in which a large operating base may be located near Beryl, of the total number of enrollments which the school district might expect during peak year 1989, less than 0.5 percent are other project related.

Health Care

M-X project related requirements for health care personnel and facilities are shown in Table 2.1.8-3 for Iron County. Under Alternatives 3 and 4 with the first base located near Beryl, the need for health care personnel peaks in 1985, when 16 physicians, 50 nurses, 5 dentists, 3 mental health personnel and 42 additional

Table 2.1.8-2.

PROJECTED BASELINE AND M-X INDUCED TEACHER REQUIREMENTS BY [illegible] LEVEL, BY ALTERNATIVE, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / NUMBER TEACHERS BY GRADE LEVEL	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE REQUIREMENTS	217	224	232	240	246	252	258	264	270	275	280	285	290
PROPOSED ACTION													
K-6	0	0	0	1	7	10	11	10	7	0	0	0	0
7-9	0	0	0	1	4	5	6	6	5	5	5	5	5
10-12	0	0	0	1	4	6	6	6	5	5	5	5	5
TOTAL M-X RELATED	0	0	0	2	14	21	22	22	17	10	10	10	10
M-X PLUS BASELINE	217	224	232	242	260	273	280	286	287	285	290	295	300
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	0 0	0 8	5 7	8 3	8 5	8 3	7 0	6 5	6 4	6 3	6 2
ALTERNATIVE 1													
K-6	0	0	3	13	47	76	87	93	90	74	74	74	74
7-9	0	0	2	7	25	41	47	51	44	40	40	40	40
10-12	0	0	2	8	27	43	49	53	46	42	42	42	42
TOTAL M-X RELATED	0	0	7	28	99	159	184	196	170	156	156	156	156
M-X PLUS BASELINE	217	224	239	268	345	411	442	460	440	431	434	441	446
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	3 0	11 6	40 2	63 0	71 3	74 1	62 8	56 6	55 6	54 6	53 8
ALTERNATIVE 3													
K-6	14	30	58	83	92	90	97	97	97	97	97	97	97
7-9	7	16	32	45	50	49	53	53	53	53	53	53	53
10-12	8	17	33	47	52	51	55	55	55	55	55	55	55
TOTAL M-X RELATED	29	64	123	175	194	191	205	206	205	205	205	205	205
M-X PLUS BASELINE	246	288	355	415	440	443	463	470	475	480	485	490	495
PERCENT DIFFERENCE FROM BASELINE	13 3	28 5	53 0	72 8	78 7	75 7	79 4	77 9	75 8	74 4	73 0	71 8	70 6
ALTERNATIVE 4													
K-6	14	30	58	83	92	90	97	97	97	97	97	97	97
7-9	7	16	32	45	50	49	53	53	53	53	53	53	53
10-12	8	17	33	47	52	51	55	55	55	55	55	55	55
TOTAL M-X RELATED	29	64	123	175	194	191	205	206	205	205	205	205	205
M-X PLUS BASELINE	246	288	355	415	440	443	463	470	475	480	485	490	495
PERCENT DIFFERENCE FROM BASELINE	13 3	28 5	53 0	72 8	78 7	75 7	79 4	77 9	75 8	74 4	73 0	71 8	70 6
ALTERNATIVE 5													
K-6	1	3	6	11	13	13	14	13	12	11	11	11	11
7-9	0	1	4	6	7	7	8	8	7	6	6	6	6
10-12	0	2	4	6	8	7	8	8	7	6	6	6	6
TOTAL M-X RELATED	1	6	14	23	28	27	29	31	26	24	24	24	24
M-X PLUS BASELINE	218	230	246	263	274	279	287	295	296	299	304	309	314
PERCENT DIFFERENCE FROM BASELINE	0 5	2 7	6 0	9 6	11 4	10 7	11 2	11 7	9 6	8 7	8 6	8 4	8 3
ALTERNATIVE 6													
K-6	1	3	6	11	13	13	14	13	12	11	11	11	11
7-9	0	1	4	6	7	7	8	8	7	6	6	6	6
10-12	0	2	4	6	8	7	8	8	7	6	6	6	6
TOTAL M-X RELATED	1	6	14	23	28	27	29	31	26	24	24	24	24
M-X PLUS BASELINE	218	230	246	263	274	279	287	295	296	299	304	309	314
PERCENT DIFFERENCE FROM BASELINE	0 5	2 7	6 0	9 6	11 4	10 7	11 2	11 7	9 6	8 7	8 6	8 4	8 3

SOURCE: [illegible] SCIENCES, 1-NOV-80

Table 2.1.8-3.

PROJECTED BASELINE AND M-X RELATED HEALTH SERVICES AND HOSPITAL BED REQUIREMENTS, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / REQUIREMENTS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE													
PHYSICIANS	27	28	29	30	31	32	32	33	34	34	35	36	36
REGISTERED NURSES	82	85	88	91	93	96	98	100	103	104	106	108	110
DENTISTS	9	10	10	10	11	11	11	11	12	12	12	12	13
MENTAL HEALTH PERSON	4	5	5	5	5	5	5	6	6	6	6	6	6
HOSPITAL BEDS	73	75	78	81	83	85	87	89	91	93	94	96	98
PROPOSED ACTION													
PHYSICIANS	0	0	0	0	1	1	1	1	0	0	0	0	0
REGISTERED NURSES	0	0	0	1	4	5	5	3	1	1	1	1	1
DENTISTS	0	0	0	0	0	0	0	0	0	0	0	0	0
MENTAL HEALTH PERSON	0	0	0	0	0	0	0	0	0	0	0	0	0
HOSPITAL BEDS	0	0	0	0	3	4	4	3	1	1	1	0	0
ALTERNATIVE 1													
PHYSICIANS	0	0	1	4	8	12	11	8	5	2	2	2	2
REGISTERED NURSES	0	0	3	13	27	30	35	26	15	8	8	8	8
DENTISTS	0	0	0	1	3	4	4	3	1	1	1	1	1
MENTAL HEALTH PERSON	0	0	0	0	1	2	2	1	0	0	0	0	0
HOSPITAL BEDS	0	0	3	12	22	31	30	23	13	7	7	7	7
ALTERNATIVE 3													
PHYSICIANS	3	8	12	16	15	12	9	4	3	3	3	3	3
REGISTERED NURSES	10	25	38	50	47	36	27	11	11	11	11	11	11
DENTISTS	1	2	4	5	5	4	3	1	1	1	1	1	1
MENTAL HEALTH PERSON	0	1	2	3	2	2	1	0	0	0	0	0	0
HOSPITAL BEDS	7	20	31	42	41	32	24	10	10	10	10	10	10
ALTERNATIVE 4													
PHYSICIANS	3	8	12	16	15	12	9	4	3	3	3	3	3
REGISTERED NURSES	10	25	38	50	47	36	27	11	11	11	11	11	11
DENTISTS	1	2	4	5	5	4	3	1	1	1	1	1	1
MENTAL HEALTH PERSON	0	1	2	3	2	2	1	0	0	0	0	0	0
HOSPITAL BEDS	7	20	31	42	41	32	24	10	10	10	10	10	10
ALTERNATIVE 5													
PHYSICIANS	0	0	1	2	3	2	2	1	0	0	0	0	0
REGISTERED NURSES	0	2	4	6	8	6	6	5	2	2	1	1	1
DENTISTS	0	0	0	0	1	0	0	0	0	0	0	0	0
MENTAL HEALTH PERSON	0	0	0	0	0	0	0	0	0	0	0	0	0
HOSPITAL BEDS	0	1	3	5	7	6	5	5	2	1	1	1	1
ALTERNATIVE 6													
PHYSICIANS	0	0	1	2	3	2	2	1	0	0	0	0	0
REGISTERED NURSES	0	2	4	6	8	6	6	5	2	2	1	1	1
DENTISTS	0	0	0	0	1	0	0	0	0	0	0	0	0
MENTAL HEALTH PERSON	0	0	0	0	0	0	0	0	0	0	0	0	0
HOSPITAL BEDS	0	1	3	5	7	6	5	5	2	1	1	1	1

SOURCE: HDR SCIENCES, 1 NOV 80

hospital beds would be required. These requirements would be somewhat smaller under Alternative 1. M-X related peak demand increases for normal baseline growth requirements by about 50 percent, putting short-term pressure on the local health care facilities. In the long run, demand decreases to 3 physicians, 11 nurses, 1 dentist, and 10 hospital beds forming the 10 percent of the normal baseline demand.

Location of base near Beryl would have some spillover population in Beaver and Washington counties in Utah and Lincoln County in Nevada. The peak year demand in these counties would be 9 additional health care personnel and 6 hospital beds in Beaver, 8 health care personnel and 5 beds in Washington and 9 health care personnel and 6 beds in Lincoln County.

Public Safety

Tables 2.1.8-4 and 2.1.8-5 present the requirements for law enforcement and fire personnel in Iron County resulting from the M-X project. Iron County police and fire personnel requirements peak in 1986 and 1985, respectively, under both Alternatives 3 and 4. Under Alternative 1 the peak occurs in 1988 for police personnel and in 1987 for fire personnel. The number of additional law enforcement personnel in the peak year of Alternatives 3 and 4 is expected to be 104.9 percent above the number projected to be needed under normal growth conditions. This dramatic increase will likely place heavy burdens on the existing public safety system.

Problems of crowded facilities, particularly jails and of attracting and keeping enough qualified people to serve as deputies and police officers will be critical ones. Fire personnel requirements reach a level 63.6 percent over baseline in the peak year. Under Alternative 1 police requirements are 79.1 percent and fire 45.7 percent over baseline in the peak year. Beaver County in the peak years will experience spillover population demands from Iron County when the first base is located near Beryl.

Subsequent to peak year demands on public safety services the out-migration of construction workers will occur, resulting in a continuing decrease at the county level in total personnel requirements attributable to M-X deployment. Personnel requirements stabilize and reach a steady state around 1991 for police personnel and 1989 or 1990 for fire personnel. This is the level of impact which can be most usefully mitigated through long range planning. The aforementioned tables indicate the number of police and fire personnel that will be required in the long-term and the percent over baseline requirements they represent. In Iron County these long term needs can possibly be accommodated with sufficient advance planning and funding, however, the requirements are a large increase over baseline (71.7 for police and 23.7 for fire) under Alternatives 3 and 4. This level of impact will require substantial and permanent expansion of police and fire facilities and personnel.

Parks and Recreation

M-X-induced population in-migration to the Beryl area will create an increased demand for both urban and regional parks and recreational facilities in Iron County. To meet these increased needs recreation planning capabilities, funds and land will be required. The number of acres of land projected to be required for

Table 2.1.8-4.

PROJECTED BASELINE AND M-X RELATED REQUIREMENTS FOR LAW ENFORCEMENT PERSONNEL BY ALTERNATIVE, IN TROOPS
ASSUMING TREND BASELINE

ALTERNATIVE / PERSONNEL REQUIREMENTS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE REQUIREMENTS	36	37	39	40	41	42	43	44	45	46	47	48	49
PROPOSED ACTION													
M-X REQUIREMENTS	0	0	0	0	2	3	4	3	3	2	2	2	2
M-X PLUS BASELINE	36	37	39	40	43	45	47	47	48	48	49	50	51
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	0 0	0 0	4 8	7 0	9 2	6 7	6 6	4 3	4 2	4 1	4
ALTERNATIVE 1													
M-X REQUIREMENTS	0	0	1	6	19	30	34	34	28	25	25	25	25
M-X PLUS BASELINE	36	37	40	46	60	72	77	78	73	71	72	73	74
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	2 5	14 7	45 5	70 3	77 8	76 0	61 1	53 6	52 6	51 7	50 9
ALTERNATIVE 3													
M-X REQUIREMENTS	6	14	27	38	43	40	41	39	34	33	33	33	33
M-X PLUS BASELINE	42	51	66	78	84	82	84	83	79	79	80	81	82
PERCENT DIFFERENCE FROM BASELINE	16 3	36 9	68 7	93 4	103 1	93 7	93 8	87 2	74 3	70 8	69 5	68 3	67 2
ALTERNATIVE 4													
M-X REQUIREMENTS	6	14	27	38	43	40	41	39	34	33	33	33	33
M-X PLUS BASELINE	42	51	66	78	84	82	84	83	79	79	80	81	82
PERCENT DIFFERENCE FROM BASELINE	16 3	36 9	68 7	93 4	103 1	93 7	93 8	87 2	74 3	70 8	69 5	68 3	67 2
ALTERNATIVE 5													
M-X REQUIREMENTS	0	1	2	4	5	5	5	5	4	4	4	4	4
M-X PLUS BASELINE	36	38	41	44	46	47	48	49	49	50	51	52	53
PERCENT DIFFERENCE FROM BASELINE	0 0	2 6	5 1	9 8	12 0	11 7	11 4	11 2	8 7	8 6	8 4	8 3	8 1
ALTERNATIVE 6													
M-X REQUIREMENTS	0	1	2	4	5	5	5	5	4	4	4	4	4
M-X PLUS BASELINE	36	38	41	44	46	47	48	49	49	50	51	52	53
PERCENT DIFFERENCE FROM BASELINE	0 0	2 6	5 1	9 8	12 0	11 7	11 4	11 2	8 7	8 6	8 4	8 3	8 1

SOURCE: IDA SCIENCES, 1 NOV 80

Table 2.1.8-5.

PROJECTED BASELINE AND M-X RELATED REQUIREMENTS FOR FIRE PROTECTION PERSONNEL BY ALTERNATIVE, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / PERSONNEL REQUIREMENTS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE REQUIREMENTS	30	31	32	33	34	35	36	36	37	38	39	39	40
PROPOSED ACTION													
M-X REQUIREMENTS	0	0	0	0	2	3	3	3	2	2	2	2	2
M-X PLUS BASELINE	30	31	32	33	36	38	39	39	39	40	41	41	42
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	0 0	0.0	5 8	8 5	8 3	8 1	5 3	5 2	5 1	5 0	4 9
ALTERNATIVE 1													
M-X REQUIREMENTS	0	0	1	5	11	16	16	13	9	6	6	6	6
M-X PLUS BASELINE	30	31	33	38	45	51	52	49	46	44	45	45	46
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	3 1	14 9	32 0	45 4	44 4	35 2	23 8	15 6	15 3	15 0	14 8
ALTERNATIVE 3													
M-X REQUIREMENTS	4	9	15	21	20	16	14	9	9	9	9	9	9
M-X PLUS BASELINE	34	40	47	54	54	51	50	45	46	47	48	48	49
PERCENT DIFFERENCE FROM BASELINE	13 2	28 7	46 3	62 5	58 1	45 4	38 8	24 4	23 8	23 4	23 0	22 6	22 2
ALTERNATIVE 4													
M-X REQUIREMENTS	4	9	15	21	20	16	14	9	9	9	9	9	9
M-X PLUS BASELINE	34	40	47	54	54	51	50	45	46	47	48	48	49
PERCENT DIFFERENCE FROM BASELINE	13 2	28 7	46 3	62 5	58 1	45 4	38 8	24 4	23 8	23 4	23 0	22 6	22 2
ALTERNATIVE 5													
M-X REQUIREMENTS	0	0	2	3	4	4	4	4	3	3	3	3	3
M-X PLUS BASELINE	30	31	34	36	38	39	40	40	40	41	42	42	43
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	6 2	8 9	11 6	11 4	11 1	10 8	7 9	7 8	7 7	7 5	7 4
ALTERNATIVE 6													
M-X REQUIREMENTS	0	0	2	3	4	4	4	4	3	3	3	3	3
M-X PLUS BASELINE	30	31	34	36	38	39	40	40	40	41	42	42	43
PERCENT DIFFERENCE FROM BASELINE	0 0	0 0	6 2	8 9	11 6	11 4	11 1	10 8	7 9	7 8	7 7	7 5	7 4

SOURCE HDR SCIENCES, 1 NOV 80

expansion of local recreational facilities in Iron County are presented in Table 2.1.8-6. The projected population growth due to M-X would increase the total peak year urban land requirements for recreation and parks by 78 acres and long-term requirements by 34 acres if Beryl is chosen as the site for the first base, and by 63 and 25 acres respectively, if it is chosen as the site for the second base. Additional rural acreage may be required for such recreational pursuits as off-road vehicular activity in order to spare habitats of rare and endangered species of plants and wildlife.

The U.S. Forest Service could open more lands for informal outdoor activities, such as hunting, fishing and camping. Also, through subdivision and Planned Unit Development ordinances a community can require certain amounts of recreation or open space in housing and mobile home development.

It is assumed that the present capacity of parks and playgrounds would be sufficient to meet the baseline requirements and all new requirements would be planned for with the expansion of residential areas of the communities.

Solid Waste Disposal

M-X-induced in-migration to the Beryl area will result in the generation of additional quantities of residential, commercial, and industrial solid wastes. The following discussion will present estimates of the land area which would be required to accommodate baseline, M-X and other project demands for solid waste disposal. It is assumed that a sanitary landfill would be utilized and that the average annual per capita area requirement would be 0.00015 acre when piled to a depth of 10 ft.

The population estimated to reside in Iron County under baseline growth conditions is expected to exhaust the land fill area currently available for solid waste disposal by 1985. Should Beryl be chosen as a site for a main operating base, as under Alternative 3 and 5 it is estimated that a parcel of about 25 acres would adequately provide for the disposal of M-X induced solid waste through 2009, that is over the 20-years operational life of the M-X system.

If on the other hand, Beryl is chosen to be the site for the second base, the M-X-induced population increment demands for solid waste disposal land area will begin in 1984 and 17.5 acres of landfill area will provide for the Iron County M-X-induced solid wastes stream through the life of the M-X system.

The effects of M-X OB sites on Iron County land requirements for solid waste disposal are illustrated in Table 2.1.8-7.

EFFECTS ON QUALITY OF LIFE (2.1.9)

The impact projections are conditional in that they are contingent on the actions taken by policy makers and also on the basic assumptions concerning factors such as the levels and pace of development which will occur. Moreover, the components of quality of life are numerous and complex and there is a great deal of uncertainty as to the probable outcomes since the basic models are lacking. Individual preference functions are unknown and community preference functions are hard to ascertain. Nevertheless, an attempt has been made to provide comparisons, within the framework of certain assumptions, suggestive of the trend of growth impacts on communities in question.

Table 2.1.8-6.

PROJECTED M-X RELATED LAND REQUIREMENTS FOR PARKS AND PLAYGROUNDS, BY ALTERNATIVE, IN IRON
ASSUMING TREND BASELINE

ALTERNATIVE / LAND REQUIREMENTS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
PROPOSED ACTION													
PLAYGROUNDS	0	0	0	0	1	2	2	2	2	1	1	1	1
NEIGHBORHOOD PARKS	0	0	0	0	2	3	3	3	2	2	2	2	2
COMMUNITY PARKS	0	0	0	1	5	8	8	8	6	6	6	6	6
TOTAL	0	0	0	1	8	13	13	13	10	9	9	9	9
ALTERNATIVE 1													
PLAYGROUNDS	0	0	1	3	7	10	10	8	6	4	4	4	4
NEIGHBORHOOD PARKS	0	0	1	4	9	13	13	11	7	5	5	5	5
COMMUNITY PARKS	0	0	3	13	28	40	40	33	23	16	16	16	16
TOTAL	0	0	5	20	44	63	63	52	36	25	25	25	25
ALTERNATIVE 3													
PLAYGROUNDS	3	6	10	13	12	10	8	6	5	5	5	5	5
NEIGHBORHOOD PARKS	3	8	12	17	16	13	11	7	7	7	7	7	7
COMMUNITY PARKS	10	24	38	51	50	40	34	22	22	22	22	22	22
TOTAL	16	38	60	81	78	63	53	35	34	34	34	34	34
ALTERNATIVE 4													
PLAYGROUNDS	3	6	10	13	12	10	8	6	5	5	5	5	5
NEIGHBORHOOD PARKS	3	8	12	17	16	13	11	7	7	7	7	7	7
COMMUNITY PARKS	10	24	38	51	50	40	34	22	22	22	22	22	22
TOTAL	16	38	60	81	78	63	53	35	34	34	34	34	34
ALTERNATIVE 5													
PLAYGROUNDS	0	0	1	2	3	3	3	3	2	2	2	2	2
NEIGHBORHOOD PARKS	0	1	2	3	4	3	4	4	3	3	3	3	3
COMMUNITY PARKS	0	2	5	9	11	10	11	11	9	8	8	8	8
TOTAL	0	3	8	14	18	16	18	18	14	13	13	13	13
ALTERNATIVE 6													
PLAYGROUNDS	0	0	1	2	3	3	3	3	2	2	2	2	2
NEIGHBORHOOD PARKS	0	1	2	3	4	3	4	4	3	3	3	3	3
COMMUNITY PARKS	0	2	5	9	11	10	11	11	9	8	8	8	8
TOTAL	0	3	8	14	18	16	18	18	14	13	13	13	13

SOURCE: IIDA SCIENCES, 1 NOV 80

Table 2.1.8-7

PROJECTED BASELINE AND M-X RELATED LAND REQUIREMENTS (ACRES) FOR SOLID WASTE DISPOSAL, BY ALTERNATIVE, IN IRON ASSUMING TREND BASELINE

ALTERNATIVE / LAND REQUIREMENTS	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BASELINE REQUIREMENTS	2.8	2.8	2.9	3.1	3.1	3.2	3.3	3.4	3.4	3.5	3.6	3.6	3.7
PROPOSED ACTION													
M-X REQUIREMENTS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2
M-X PLUS BASELINE	2.8	2.8	2.9	3.1	3.3	3.5	3.6	3.7	3.6	3.7	3.8	3.8	3.9
PERCENT DIFFERENCE FROM BASELINE	0.0	0.0	0.0	0.0	4.4	9.4	9.2	8.9	5.8	5.7	5.6	5.5	5.4
ALTERNATIVE 1													
M-X REQUIREMENTS	0.0	0.0	0.1	0.5	1.1	1.5	1.5	1.2	0.8	0.6	0.6	0.6	0.6
M-X PLUS BASELINE	2.8	2.8	3.0	3.6	4.2	4.7	4.8	4.6	4.2	4.1	4.2	4.2	4.3
PERCENT DIFFERENCE FROM BASELINE	0.0	0.0	3.4	16.4	35.2	46.8	45.8	35.8	23.3	17.2	16.8	16.6	16.3
ALTERNATIVE 3													
M-X REQUIREMENTS	0.4	0.9	1.4	1.9	1.9	1.5	1.3	0.8	0.8	0.8	0.8	0.8	0.8
M-X PLUS BASELINE	3.2	3.7	4.3	5.0	5.0	4.7	4.6	4.2	4.2	4.3	4.4	4.4	4.5
PERCENT DIFFERENCE FROM BASELINE	14.5	31.6	47.5	62.3	60.7	46.8	39.7	23.8	23.3	22.9	22.5	22.1	21.7
ALTERNATIVE 4													
M-X REQUIREMENTS	0.4	0.9	1.4	1.9	1.9	1.5	1.3	0.8	0.8	0.8	0.8	0.8	0.8
M-X PLUS BASELINE	3.2	3.7	4.3	5.0	5.0	4.7	4.6	4.2	4.2	4.3	4.4	4.4	4.5
PERCENT DIFFERENCE FROM BASELINE	14.5	31.6	47.5	62.3	60.7	46.8	39.7	23.8	23.3	22.9	22.5	22.1	21.7
ALTERNATIVE 5													
M-X REQUIREMENTS	0.0	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
M-X PLUS BASELINE	2.8	2.9	3.1	3.4	3.5	3.6	3.7	3.8	3.7	3.8	3.9	3.9	4.0
PERCENT DIFFERENCE FROM BASELINE	0.0	3.5	6.0	9.8	12.8	12.5	12.2	11.9	8.7	8.6	8.4	8.3	8.1
ALTERNATIVE 6													
M-X REQUIREMENTS	0.0	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
M-X PLUS BASELINE	2.8	2.9	3.1	3.4	3.5	3.6	3.7	3.8	3.7	3.8	3.9	3.9	4.0
PERCENT DIFFERENCE FROM BASELINE	0.0	3.5	6.0	9.8	12.8	12.5	12.2	11.9	8.7	8.6	8.4	8.3	8.1

SOURCE: HDR SCIENCES, 4-NOV-80

The rapid population growth that can be anticipated if an operating base is located in the vicinity of Beryl will result in many objective and subjective changes in the quality of life in the surrounding communities. Figure 2.1.9-1 attempts to show potential changes in the quality of life that might reasonably be expected. The histograms portray an assessment of the impact on the quality of life, as measured by a particular index, in a range from acceptable to unacceptable. The four segments of the figure depict: (a) Baseline I, which simply portrays the county's particular index value as a proportion of the corresponding state index value (where acceptable denotes a value that is 50 percent better than the state figure, and unacceptable represents a value that is 100 percent worse than the state figure), for Baseline II quality of life indices; (b) Baseline II, the anticipated changes in these indices without M-X deployment in the county, but with normal projected population growth; (c) anticipated changes during the M-X construction phase compared to Baseline II, and (d) anticipated changes during the M-X operations phase compared to Baseline II. Changes in the indices are assumed to be related to the rapidity of population growth. Since the quality of life literature points to a rapid deterioration of social organization with boomtown growth, it is assumed that such indices as crime, alcohol and substance abuse, divorce and suicide rates, may increase as much as four times the compound annual population growth rate. The economic well-being indices, e.g., per capita income, the unemployment rate, and the public assistance ratio (the proportion of the population on public assistance of some kind), on the other hand, are assumed to change at only double the annual compound population change rate. The remaining indices, housing conditions (a measure of overcrowding), school overcrowding (the ratio of pupils to teachers), health care (doctors, dentists and registered nurses per 1,000 population, the number of hospital beds per 1,000 population), and public safety (ratio of police officers to population), collectively referred to as the community service indices, are all assumed to change inversely and linearly with the compound annual rate of population change.

Quality of Life Indicators Without M-X

Iron County's population is projected to increase at a compound annual growth rate of 2.6 percent over the 1982 to 1992 period. This modest growth rate is unlikely to substantially alter the quality of life in Iron County. Housing, already considerably below state values, will be slightly worse, as will the three community service indices initially at or below state norms (Figure 2.1.9-1., upper right quadrant, which shows the Baseline II profile over Baseline I). Crime, divorce and suicide rates, all can be expected to increase somewhat, but because these rates were initially well below Utah's average rates, they will not detract significantly from Iron County's already high standing on these aspects of the quality of life. Two of the economic well-being indices, the unemployment rate and per capita income which were about 20 percent below the state standards, can be expected to improve, although not enough to raise them above Utah's norm. The proportion of the population on public assistance, already below state figures, will probably decrease a little, thus enhancing this aspect of the quality of life (Figure 2.1.9-1, upper left quadrant).

Quality of Life During the M-X Construction Phase

During the construction phase, assuming that an operating base is located near Beryl, a peak cumulative influx of 21,000 additional people is expected, resulting in a peak cumulative population change of 104 percent over Baseline II in 1986. Up to the

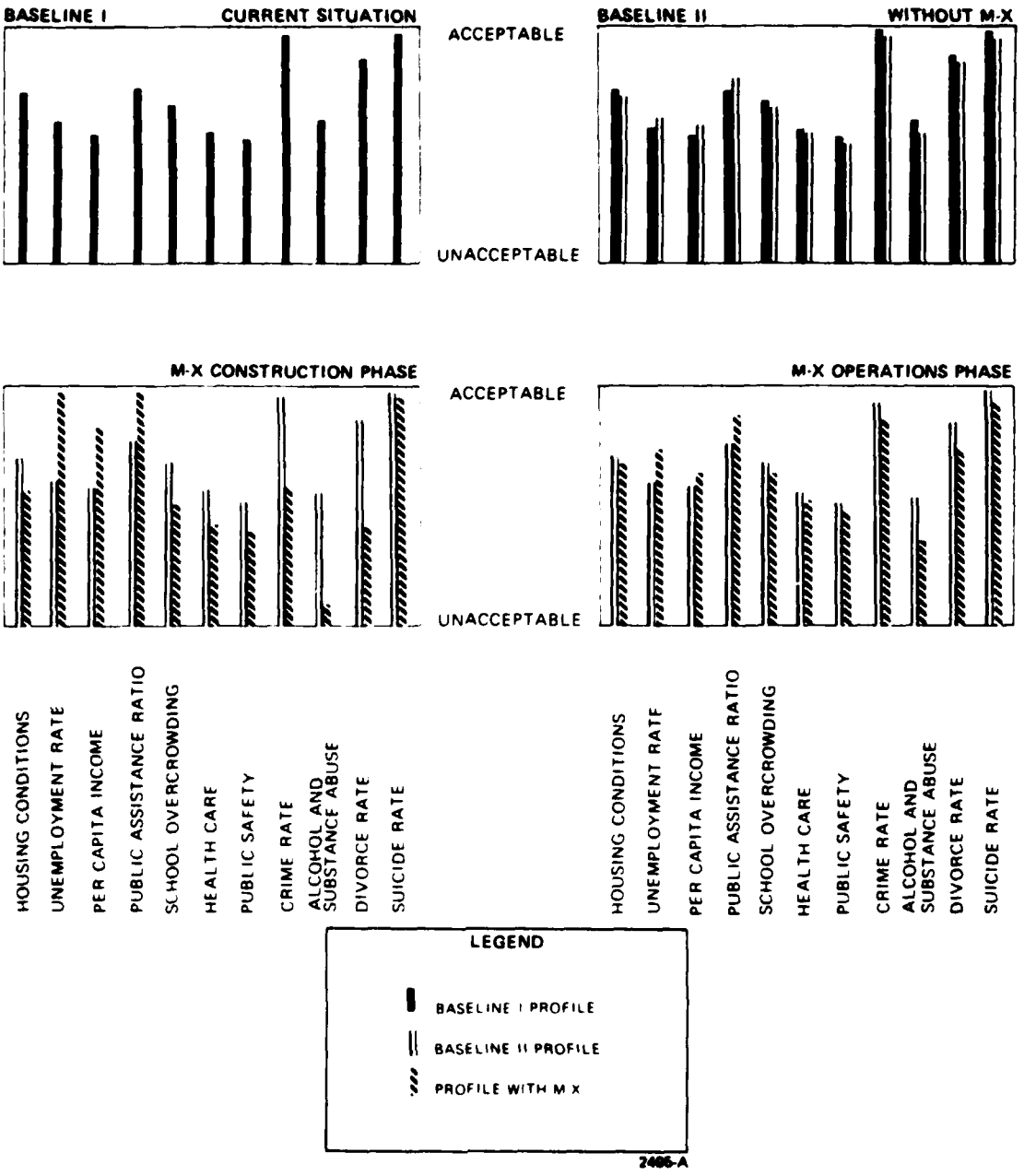

Figure 2.1.9-1. Potential changes in the quality of life profiles of Iron County, Utah.

peak construction year, the population will be growing at a compound annual rate of 12 percent. This rapid pace is likely to significantly exacerbate housing conditions and the community service indices, all of which were worse than the state average for Utah to begin with, with the exception of school overcrowding which was the same initially. Similarly, social disorganization is likely to be increasingly reflected in higher crime, alcohol and substance abuse and divorce rates, all of which can be expected to be higher than the state baseline averages and thus detract noticeably from Iron County's quality of life (Figure 2.1.9-1, lower left quadrant). Suicide rates will probably also increase, but Iron County baseline rate is so low compared to the Utah average, that even a large increase in the incidence of suicides will still leave Iron County better off than the state average.

The economic well-being indices should benefit from the rapid rate of population growth, with unemployment rates and per capita incomes considerably better than the Utah average, whereas they were both below state averages without M-X (Figure 2.1.9-1, lower left quadrant). The proportion of the population on public assistance might also reasonably be expected to decrease, thus improving an already positive aspect of the quality of life.

Quality of Life During the M-X Operations Phase

By 1992, the steady-state M-X related population influx will have leveled off to some 17,000 persons, representing a 71 percent increase over the baseline population in that year. It will have taken 10 years to reach this level, denoting compound annual growth rate of 6.6 percent. This overall rate of growth, while substantial, is considerably less than the construction phase growth rate and so the impacts on the quality of life can be expected to be less marked. Housing conditions and the community service indices will all still be below state averages, as indeed they were in the baseline. The only social disorganization index that might still be expected to be worse than the Utah statistic is that for alcohol and substance abuse. The other three social disorganization indices, the crime, divorce and suicide rates, all of which will undoubtedly increase, should still be lower than Utah's baseline averages and thus still rank positively as components of Iron County's quality of life (Figure 2.1.9-1, lower right quadrant). The unemployment rate and public assistance population should be lower, and thus better, than the state figures, contributing positively to the quality of life, while per capita incomes will probably remain below the state figure, although better than they were without M-X.

EFFECTS ON ENERGY (2.1.10)

Construction and operation of the M-X defense system in the vicinity of Beryl would require substantial improvements in energy transportation capabilities. Since development of these energy handling facilities must be in concert with M-X system construction, rather than competing for the scarce energy supplies, M-X would bring additional energy into the area. Natural gas supplies will not be available in the area during the first years of M-X development as the PGT gas line will not be completed until 1986. During the interim, bottled fuel and fuel oil will have to be trucked in from Las Vegas and Salt Lake City. Diesel fuel and gasoline will have to be reallocated to satisfy the increased demand during M-X system construction.

The electric power demand in the Beryl area due to the M-X operating base and its related population increase is projected to be about 39 MW. Since the

present Dixie-Escalante system peak capacity is approximately 20 MW and served by a 12 KV rural distribution line, this increase in electrical load will have a substantial impact. One or more transmission lines and new substations and distribution facilities would be required.

Dixie-Escalante, the supplier of electrical power in the Beryl area, is a member of the Intermountain Consumers Power Association and is a participant in the Moon Lake, Hunter, and IPP generating plant projects. Representatives of Dixie-Escalante state that the bulk-power requirements of the M-X operating base can be met provided a sufficiently early commitment is made by the Air Force to permit scheduling of power. See of the Power and Energy Technical Report for detailed information.

Mitigations

Careful siting, taking into account the environmental restrictions and concerns, can mitigate the potential impacts of both fuel and power facilities. Coordination with the utility companies can assure minimum impact on current electrical power and fuel users and assure that the M-X system becomes operational as planned. Similarly, impacts on fuel availability can be mitigated by timely adjustment of allocations. Alternate energy system development and energy conserving construction will reduce external energy demands.

EFFECTS ON TRANSPORTATION (2.1.11)

The employment opportunities generated by construction and operation of an operating base near Beryl would result in a large influx of people into the area and a corresponding increase in traffic. This growth in traffic would develop within the base itself, on the adjacent road system and in neighboring communities. Adverse impacts would occur when the growth in traffic causes delay and inconvenience to motorists or where road improvements are needed to accommodate the anticipated traffic.

For the most part the location and magnitude of the impacts depend upon where the off-base development occurs. The amount of off-base development and the corresponding increases in traffic are dependent upon the number of military and civilian employees that would move into the area and would reside in communities near the base. Once the base in fully operational twenty percent of the military personnel and their dependents would live in communities near the base and commute to work, as would all of the civilian employees. In addition to the commute trips, the military personnel and their dependents would make trips to the base to take advantage of the shopping and other amenities provided on the base. Besides the population increases associated with direct employment opportunities, there would be additional in-migration to satisfy the indirectly generated employment opportunities. All of these people would be making numerous trips within the communities in which they reside. It is the total traffic generated by all in-migrants that cause the impacts.

For traffic analysis purposes in this report, each new household was assumed to generate ten trips, or traffic movements, on an average day comprised of all home based trips, including work trips, and non-home based trips. When new M-X induced employment opportunities are satisfied by indigenous population it was

assumed that travel patterns would change to reflect travel to the new employment center, the operating base.

Each of the communities near the site, notably Cedar City, Enterprise and Newcastle, are expected to have direct and indirect M-X induced growth and corresponding increases in traffic. Figures 2.1.11-1 and 2.1.11-2 present traffic estimates for the vicinity of the operating base. Shown are estimates for a first and second operating base including future baseline traffic without the project, assuming the high baseline case, and M-X related traffic. The year 1992 was used for analysis purposes since it represents the long-term, steady state condition that is expected to continue over the life of the project. (Refer to Section 2.1.4 for a discussion of the impacts on population.)

State route 56 between Beryl Junction and Cedar City would have a substantial increase in traffic, but it should still be less than the capacity of the two lane road even during peak periods, whether a first or second base is constructed. The road between Beryl and Beryl Junction will have to carry the largest volume of traffic and will probably have to be improved.

Almost 1,500 new households are anticipated within Iron County as a result of in-migration to satisfy the employment opportunities created by the Proposed Action. These would generate nearly 15,000 new trips, or traffic movements. Provisions, including new roads as well as new homes, would have to be made to accommodate the growth. The communities of Newcastle and Enterprise would probably receive a large enough increase in traffic under either base scenario to strain the existing transportation infrastructure. Good planning and orderly development can prevent many traffic problems from developing, but localized traffic problems requiring road improvements or modifications would probably be required on the existing street system. Specific impacts would depend upon where growth actually occurs and the number of persons who choose to reside in or near those communities. Cedar City is a larger community and less likely to have significant traffic problems attributable to the M-X induced growth although some problems may occur.

Because of the remoteness of the site it is assumed for purposes of traffic analysis that a "new town" type of development would occur near the base which would attract about 40 percent of the base personnel who do not live on the base. "New town" development is consistent with the Iron County Master Plan which encourages growth in existing communities but which recognizes that "new towns" may be required if new industries, presumably including military bases, locate in remote areas not contiguous to existing communities. Presumably the development would be planned in a manner to preclude traffic problems. In the event this development did not occur, there would be correspondingly larger growth and, therefore more traffic, in the other communities.

The traffic generated on the base would primarily stay on the base itself with only a small portion having off-base destinations. Therefore, it would have no effect on the adjacent road system. The trips made to off-base destination by base personnel have been included in the traffic estimates presented herein.

During the construction phase there would be a large temporary increase in population within the local communities. These would be the people participating in

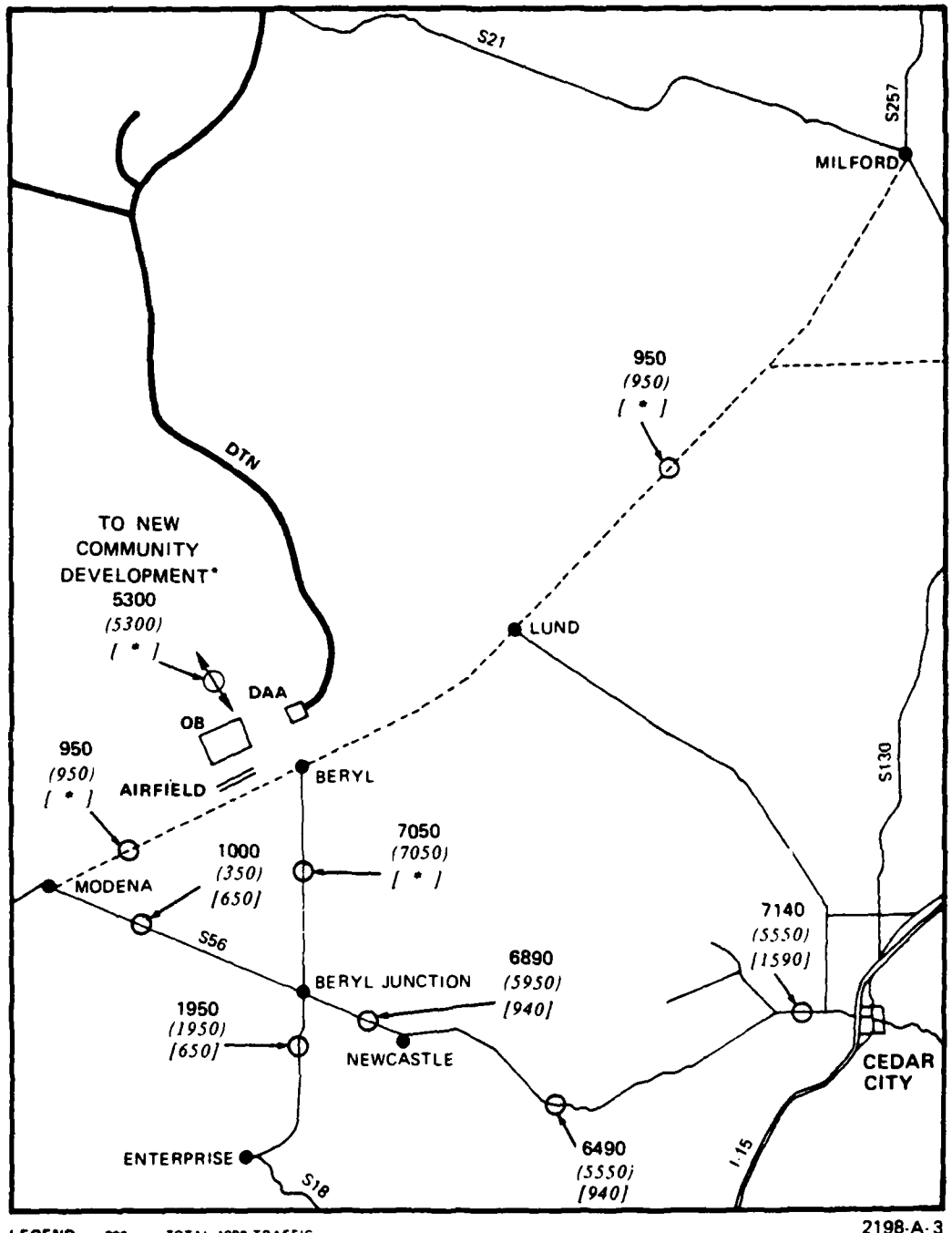

Figure 2.1.11-1. Traffic estimates for the vicinity of the OB.

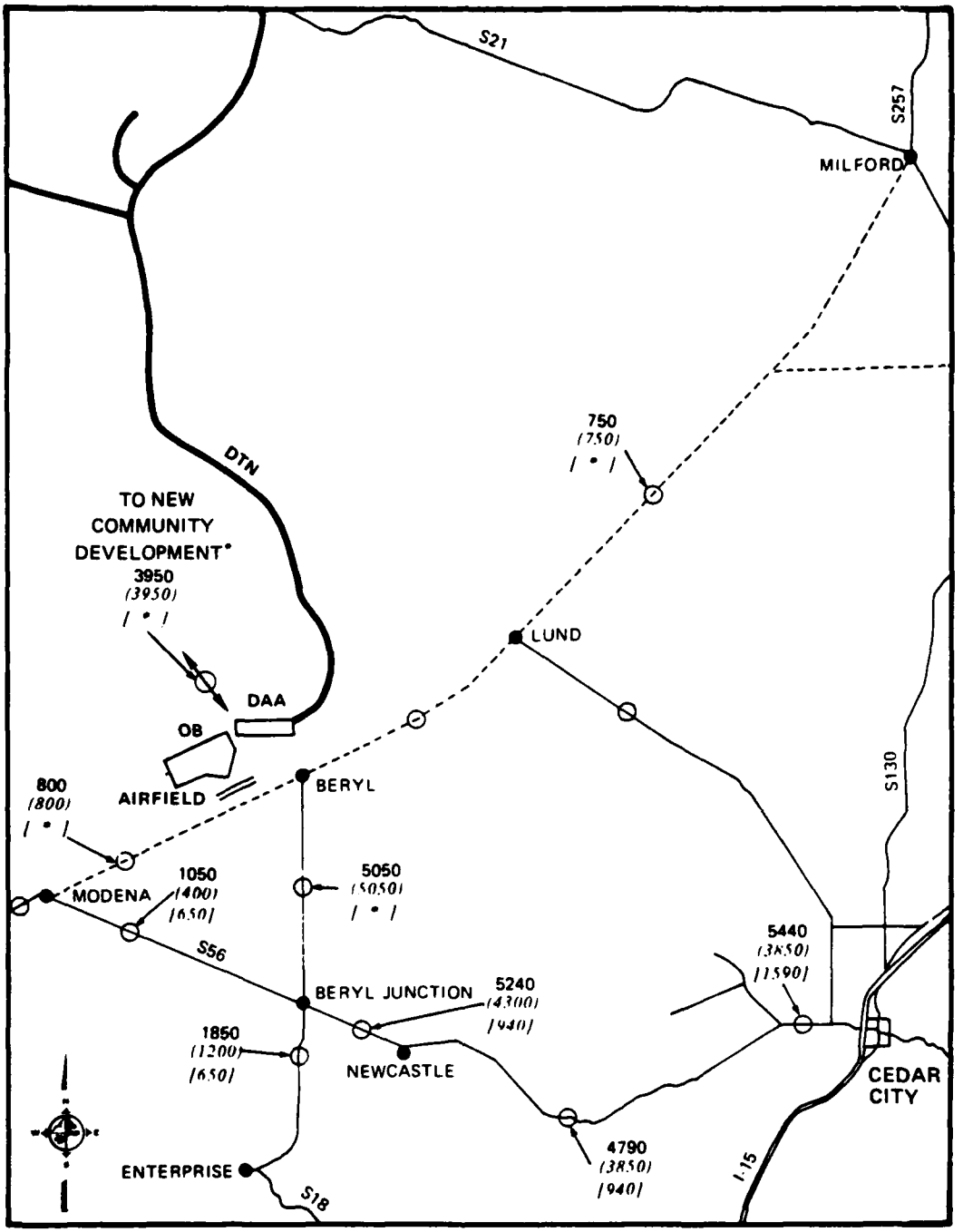

Figure 2.1.11-2. Traffic estimates for the vicinity of the OB.

construction of the operating base, the assembly and check out personnel, the people participating in construction of the facilities in the neighboring communities that will be necessary to accommodate the new permanent residents, and the support people for all of the temporary workers. All of these people would remain only a few years and by 1992 they would all have moved out of the area, leaving only the permanent residents.

During the time these people are living in the area they will be generating traffic. The impacts associated with this short term level of traffic could occur in either of two ways depending upon how the local communities planned for the traffic. If no special provisions were made to accommodate this short-term growth, the traffic would likely strain the street system, exceeding capacity at critical locations and along major routes. At those locations congestion would occur, especially during peak periods. The amount and the extent of the short term impacts would depend upon where the temporary housing was located as well as where the new permanent development would occur. However, once the construction period was over, the traffic would subside to the levels anticipated for the long-term operations phase.

On the other hand, if the street system was expanded to the extent necessary to accommodate the short term traffic levels, then the traffic would flow smoothly without congestion, but the cost of expanding the road system would be a major impact. Once the short term effect was over, the road system would be more than adequate to accommodate the long-term traffic levels. In either case the short-term impacts would be significant.

EFFECTS ON NATIVE AMERICANS (2.1.12)

No Southern Paiute aboriginal sites are currently documented for the southern Escalante Desert area near Beryl. Although survey data are incomplete, present information suggests that the greatest potential for cultural resource loss associated with OB siting in the Beryl area occurs in surrounding mountainous areas. These higher elevation zones are rich in springs and pinyon groves, and are expected to contain a large number of ancestral sites and other culturally sensitive areas. The disturbance of aboriginal campsites, if present, is most likely to occur along ephemeral streams which emanate from the southern Wah Wah and Needle Ranges and traverse areas proposed for the OB and DAA facilities.

Whereas negative impacts to cultural resources in the Escalante Desert are expected to be minimal, proposed construction of facilities north of the DAA pose a very high disturbance potential. The DTN which connects the Escalante Desert with Pine Valley will proceed through pristine areas of a major pass known to be associated with dense aboriginal settlements. Additional, construction of the DTN in this region will require the removal of pinyon trees, a cultural resource which is highly sensitive to local Southern Paiutes.

The anticipated increased recreational use of regions adjacent to the proposed base facilities during the construction and operations phases could threaten the integrity of Southern Paiute historic and cultural resources, the majority of which have not been systematically recorded.

Archaeological surveys will precede construction activities in all areas of proposed ground disturbance. As part of the mitigation program, Southern Paiutes

from the Shivwits, Cedar City, and Indian Peaks bands should be provided the opportunity to independently evaluate this areas. This measure will ensure that all cultural resources are properly inventoried. Consultation with these tribal governments should continue through the construction period to develop acceptable measures for mitigating unavoidable impacts to culturally sensitive sites and features.

Currently, there are no Indian reserves in close proximity to the Beryl proposed OB site. However, the recent (April 1980) reinstatement of the Utah Southern Paiutes to federal trusteeship has implications for proposed land use in Iron County in general and for the OB vicinity in particular. Public Law 96-227 provides that the five bands of Southern Paiutes which were terminated in 1954 be reinstated and that their reservation lands be restored to the extent possible. Where original reservation lands cannot be restored the law provides for the acquisition of up to 15,000 acres. Iron County is one of the five Utah counties from which land can be withdrawn for reservation restoration. Since the Cedar City band is in Iron County and since this band, which has over 100 enrolled members, has never had any land, it is expected that a reservation will be created in the Cedar City vicinity in Iron County.

The Indian Peaks reservation, created in 1915, was located about 25 mi north of Beryl in Beaver County. The reservation consisted of 14 sections of land, about 9,000 acres, 18 mi north of the proposed OB. There is a possibility that these original reservation lands will be restored to the Indian Peaks band. The lands were purchased by the state of Utah, shortly after the band was terminated in 1954, and made into a Game Management area. The land is intact; none is privately owned. If the original reservation land is not restored, surrounding lands to the original reservation may be likely candidates for reservation restoration, in which case the proposed OB site and possible proposed withdrawal lands could conflict.

Indirect social and economic impacts on Native Americans are expected because of the proximity of Beryl to Cedar City, Shinwits, St. George, and other towns in which Southern Paiutes are currently living. The Southern Paiutes are an economically depressed Native American tribe and the Beryl area would probably become the focus of attention for other unemployed Native Americans as well.

Estimates of the numbers of Native Americans who might migrate into the area in search of employment are hampered by the tentative estimates of Southern Paiutes in the region. It is estimated that the population of Utah Southern Paiutes will be at least double that currently enrolled and the labor force is expected to increase substantially.

The Cedar City community is not expected to be able to absorb the increased population of workers and the family members of those who come in search of employment. Housing facilities here are inadequate to accommodate newcomers, and no federal money would become available since these in-migrants would not be enrolled members of the Cedar City band of southern Paiutes. See ETR-2 (Nevada/Utah), ETR-7 (Delta), and ETR-33 (Milford) for further information on possible impacts and suggested mitigations to Utah southern Paiutes.

Site-specific information on the physical and socioeconomic environment of the Utah Southern Paiutes has recently been collected by a field research team.

Because type and extent of impact will be site-specific, these data, when analyzed, will allow better impact projections.

EFFECTS ON ARCHAEOLOGICAL AND HISTORICAL RESOURCES (2.1.13)

Direct impacts to archaeological and historical sites cannot be fully assessed at this time due to the lack of systematic survey at the proposed base location and in the suitability zone. A total of 22 recorded sites in the immediate Beryl vicinity suggest that the locations of water sources are the most sensitive areas, and the upper bajada/foothill zone tends to be the most sensitive general topographic setting. Sixty-four percent of these 22 known sites have been recorded in the upper bajada/foothill zone, and of the site types represented, 85 percent of the more complex "multiple activity" sites are located in this topographic setting, especially in the vicinity of water sources. In the region within a 20 mi radius of the proposed Beryl OB, approximately 420 mi^2, representing 34 percent of the region, is estimated to be of moderate to high archaeological and historical sensitivity. Other extremely sensitive areas include the Parowan Valley, the Dixie National Forest to the south and east, and the Muddy River drainage to the south.

In the vicinity of the OB, as illustrated, there are three limited activity sites in the vicinity of the airstrip. These include an historic dump, and possible campsite, and a sherd and lithic scatter. Two limited activity or short-term camps are located to the southwest of Beryl. One of these may be more complex than when recorded, with buried deposits now apparently eroding from dunes.

The residential and recreational areas of the OB are currently designed to be built in the upper bajada foothill area of the Needle Range, thereby directly impacting about 5 mi^2 of moderate to high sensitivity area. Placed below the residential area on the lower bajada, the remaining OB facilities will impact about 4 mi^2 of low sensitivity area where site density is expected to be lower. No direct impacts are expected to occur to the three known sites located in the airstrip vicinity. Moving the upper residential area down to the lower bajada area or to the valley floor near Beryl is likely to result in fewer direct impacts to cultural resources.

Construction of the OBTS in the foothills to the south of the Wah Wah mountains and the proposed alignment of the DTN to Pine Valley to the north are likely to cause impacts to a number of significant cultural resources. Three multiple activity sites are recorded in the mountain pass to Pine Valley, and numerous sites are known in southern Pine Valley. The OBTS, to impact 250 acres, is situated in an area of potential high site density in the vicinity of numerous springs. Movement of the OBTS to the mid to lower bajada area would be likely to reduce direct impacts. Because the pass to this valley is expected to be an area of very high sensitivity. An alternative DTN access route which avoids the pass to Pine Valley should be considered.

Indirect impacts from induced population growth and increased access are also expected to increase. As a first OB, the Beryl OB would have an on-base population of about 14,000 in 1989, and Iron County would grow by nearly 104 percent in 1986 due to an M-X induced population growth of 21,500. Valleys subject to the greatest indirect impacts from the development of the Beryl OB are listed in Chapter 2.

2.2 NATURAL ENVIRONMENT

EFFECTS ON VEGETATION (2.2.1)

The Beryl OB site would be used for the first operating base in Alternatives 3 and 4, and for the second operating base in Alternative 1. A general discussion of impacts to native vegetation that would result from use of the Beryl site is given in Chapter 2, in the section on native vegetation.

A potentially serious impact not discussed in detail in Chapter 2 would be the invasion of disturbed rangelands by the toxic weed, halogeton (Halogeton glomeratus) (Young, et al., 1975). Halogeton can invade alkali sink scrub, shadscale scrub and Great Basin sagebrush (lower elevation zone) communities after disturbance. With severe or continued disturbance, halogeton changes soil chemistry to the point that reestablishment of native vegetation is precluded (Young et al., 1975). Halogeton is toxic to livestock, so halogeton-dominated land cannot be used for grazing (Cook and Stoddard, 1953).

Mitigation measures for impacts to native vegetation are discussed in detail in Chapter 4. These mitigation procedures are applicable to all the operating base sites.

EFFECTS ON WILDLIFE (2.2.2)

The Beryl candidate OB site is located in the Escalante Desert in the southernmost portion of pronghorn antelope range in Utah. Because of the location of the operating base and support community and the presence of an airfield with attendant jet noises, pronghorn could be driven out of of key habitat around Table Butte, 10 mi (16 km) east of Beryl. In 1986 almost 22,000 people may be added to this area. Consequently, poaching and harassment by recreationists could threaten nearby pronghorn population. The pronghorn is a regionally significant wildlife species with a high probability of being significantly impacted by M-X deployment.

Sage grouse would not be directly impacted by the OB at Beryl. However, indirect effects are anticipated to be significant under Alternative 2, 3, 5, and 6. Indirect effects were estimated using the indirect effects model.

Mule deer in the western part of Utah occur in low numbers, and human/deer encounters may be infrequent. Deer which roam the area would probably avoid roads (see Ely OB site discussion).

The transplanted elk herd on Indian Peak in the Needle Range northwest of the candidate base site may also be similarly affected by recreation, as described in the Ely candidate OB site. Several dirt roads lead up to this area from Pine Valley and may be used by people seeking recreation.

EFFECTS ON AQUATIC SPECIES (2.2.3)

The only perennial aquatic habitats within 25 mi of the proposed Beryl OB are in the Pinto Creek drainage (Utah Fishing Waters Inventory, 1980). No direct impacts to these habitats would be expected as a result of project related activities. Fishing pressure would be expected to increase as a result of increased population in

the Beryl area. Management practices, including stream restoration, stocking, legal bag size and gear restriction, would probably require modification to maintain acceptable fishing success levels.

EFFECTS ON PROTECTED SPECIES (2.2.4)

Protected Terrestrial Species

A Utah prairie dog population occurs in the southern part of Pine Valley approximately 18 mi (29 km) from the major part of the base. Other populations occur east (35 to 40 mi) of Beryl in Parowan Valley and near Cedar City, Utah. The Pine Valley population was transplanted from private lands by the Utah Division of Wildlife Resources in conjunction with the U.S. Fish and Wildlife Service and BLM. The OBTS is only a few miles south of this prairie dog town, and the DTN passes through the area. However, construction of these facilities should have little direct affect on the population as, in other locations, similar activities have not caused a decline in numbers. Most of the population decrease has been attributed to poisoning and shooting as an attempted control measure on rangeland (Pizzimenti and Collier, 1975). The significant potential source of impact on prairie dogs is expected to come from recreational use of the area. In addition, off-road use of heavy vehicles may collapse the prairie dog burrow systems. Control of recreational access would be a feasible mitigation of this potential impact. Prairie dogs would be significantly impacted by both direct and indirect effects. A segment of DTN would bisect prairie dog habitat in southern Pine Valley, Utah, causing loss of 18 to 20 acres of that habitat. Also, using the indirect effects model it was estimated that indirect effects resulting from recreationists from the Beryl OB would also cause a significant impact.

Protected Aquatic Species

There are no protected or recommended protected biologically sensitive species within the Beryl OB hydrologic subunit. The nearest sensitive habitat is that of the recommended protected Big Spring spine dace in Condor Canyon, Nevada, about 30 mi to the west. Fifty miles SSE in the Virgin River occur the federally protected woundfin (fish), the state protected round tail chub, and the recommended protected Virgin spine dace. In addition, two recommended protected invertebrates occur in a tributary of the Virgin River near this area. Degradation is expected from recreational pressure on these habitats although neither the Condor Canyon nor the Virgin River areas are important for fishing. Deterioration from increased use by campers, hikers, hunters, and picnickers will be moderate to large in spite of the distance and inaccessibility of most of the sensitive portions of these habitats. A detailed discussion of alternatives involving this OB and potential mitigations are presented in and the technical report on Protected Species (ETR-17).

Protected Rare Plants

No direct impacts to rare plants would be anticipated to result from construction of the OB in the vicinity of Beryl, Utah. No rare species are known to occur within the suitability zone. However, the DTN, as proposed, may affect a location of the Tunnel Springs beardtongue (Penstemon concinnus).

Indirect impacts as a result of recreational activity may occur. Effects may occur from a 60-70 percent net population increase in Iron County due to M-X which

would result in an increase in the use of nearby recreation areas. The extent of the effect on rare plants cannot be quantified, but recreational impacts to rare species have been documented. Rare species occurring along hiking trails have become endangered as result of trampling (FR:45:2104 (October 20, 1980).

Several populations of the timber poisonvetch (Astragalus convallarius var. finitimus) are known from within a 25 mi radius of the proposed OB. This species occurs on gravelly limestone and sandy clay hillsides with sagebrush, pinyon and juniper (Welsh and Thorne, 1979). A majority of these locations lie within the Dixie National Forest and are not likely to be affected.

EFFECTS ON WILDERNESS AND SIGNIFICANT NATURAL AREAS (2.2.5)

Since OB impacts on wilderness are detailed in Chapter 2, discussion here is limited to potential impacts on significant natural areas. Figure 2.2.5-1 shows the base location for the Beryl site. There are no significant natural areas intersecting the base suitability envelope.

As previously discussed for wilderness, impacts of the basing sites on significant natural areas are likely to be related to the recreational activities of the long-term in-migrant population. Using the indirect effects analysis discussed above, it is possible to identify Lehman Caves, Lexington Arch, Steamboat Mountain, Cedar Breaks, Bryce Canyon, Zion National Park, Red Mountains, Indian Peak, Highland Range, Gleason Canyon, and Cathedral Gorge as areas likely to receive increased recreational use.

EFFECTS ON SURFACE WATERS (2.2.6)

Availability

Effects on surface water caused by an M-X operating base will depend on the method used for acquiring surface water for the project. A primary constraint on the acquisition of water is that no new appropriations are being approved. The Utah State engineer's office controls water appropriations by adjudication and under state law is to ensure the preservation of an available water supply. Two methods are assumed as possible to meet some M-X demands:

1. Purchase of existing water rights

2. Importation

Purchase of existing water rights would not significantly change the current condition. A possible benefit could be realized from a 10 percent increased efficiency of return flow from domestic use, as opposed to irrigation. This would show up as a 10 percent reduction in consumptive use.

As all available perennial surface water is already appropriated, importation of surface water could only take place in conjunction with the other two methods of obtaining surface water for the project. The effects should be beneficial as increased recharge and increased supply and therefore increased perennial yield.

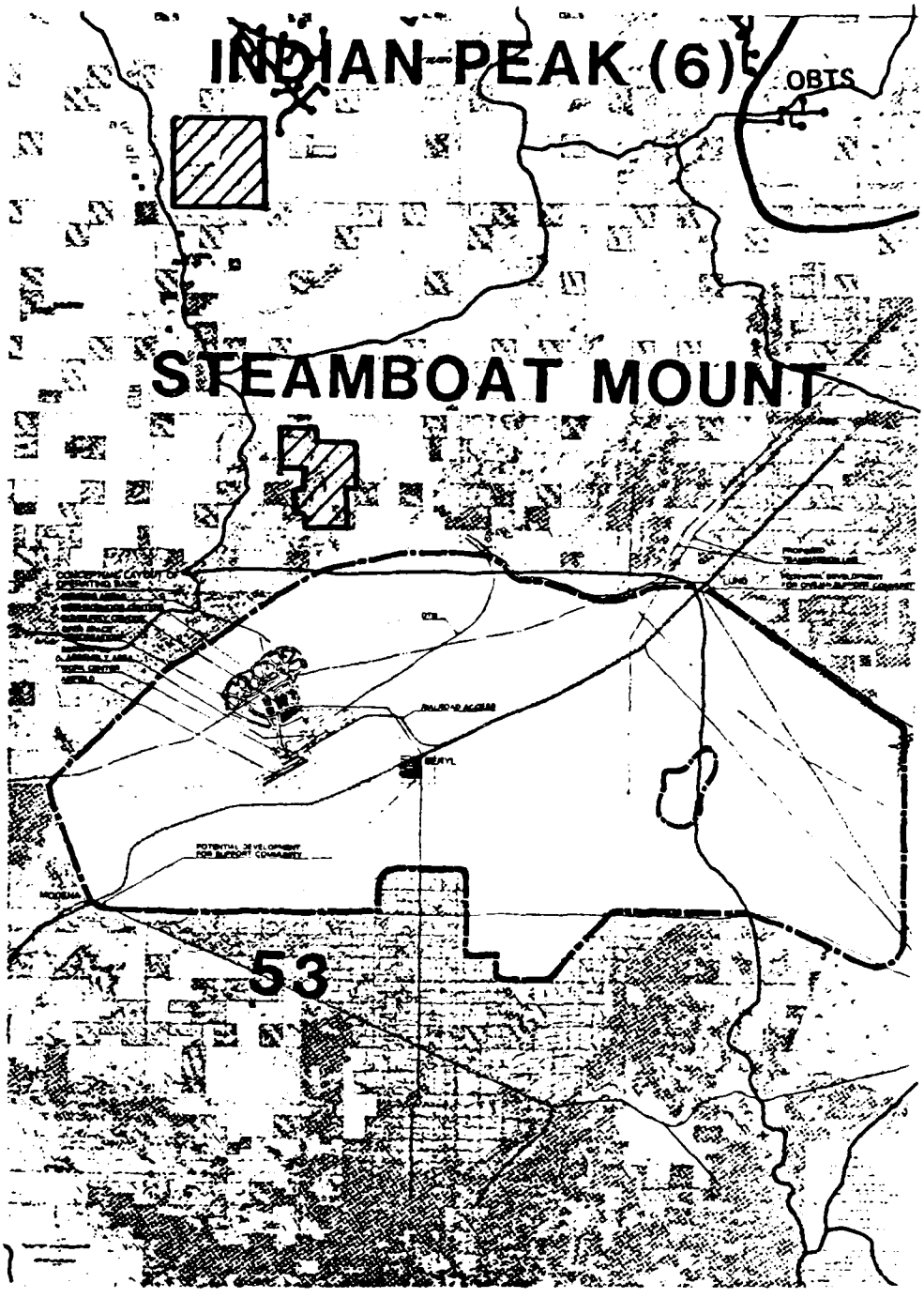

Figure 2.2.5-1. Potential impacts on significant natural areas for the Beryl OB site.

Water Quality

Construction activities would have effects upon the quality of surface waters. Most of these effects could be minimized through proper construction methods.

Construction of an operating base near Beryl would use an estimated 1,800 to 3,400 acre-ft of water. Permanent operational water requirements would be in the range of 3,700 to 4,800 acre-ft per year. Construction and maintenance of the operating base could have an impact on surface water due to increases in flooding and erosion. Storm runoff would be increased by the introduction of impermeable surfaces and channelization. General clearing, leveling and earth moving activities would be responsible for the disturbance of the soil system. The main activities include leveling and clearing, and earth moving. The exposed land surfaces, in combination with concentrated runoff during periods of rainfall, would contribute to increased erosion rates. Undesirable effects of accelerated erosion include soil loss and water quality degradation of nearby drainage systems. In steep terrain, erosion, as a consequence of excavation, could be a substantial problem. However, based on the nearby flatlying lands, the potential of erosion as a consequence of earth moving and channeling activities is expected to be reduced. In channeling activities, erosion and sedimentation processes which commonly occur are the same as for natural sources. These are (a) degradation of minor drainage ways, (b) sheet and hill erosion, (c) gully erosion, (d) flood-plain scour, (e) stream bed degradation, and (f) stream bank scour. Most of these methods of erosion may be applied to a soil spoil pile through the channeling process. In the process, the sediment produced may be transported in small streams as wash load and bed load.

In the soil spoil piles, the change in the physical and chemical characteristics of the fence metals varies by the influence of weather, the method of piling, the slope of piles the nature of the material, and the particle size distribution. Particle size of soil spoil pile varies from large boulders to fine sands. No generalization can be made concerning the typical particle size to be expected in an overburden spoil pile.

Channeling disturbance may divert chemically polluted surface water to other localities where the surface and groundwaters are free from pollution. Generally, removal or disturbance of soils will enhance the oxidation processes of trace elements due to increased air entrapment and porosity. Some trace elements become more soluble in the oxidized state and leach through the soil faster than normal. On the surface spoil soil forms a permeable crust or layer which also increases hydraulic and aeolian erosion. In filling processes, material used for stabilization, such as rock or soil transported from nearby areas, might introduce chemically and physically different soil characteristics which provide favorable conditions for chemical reactions with local minerals and produce environmentally hazardous chemical components as end products and/or by products of these reactions.

Substances used for road stabilization and dust control could cause a degradation of water quality should they be allowed to enter the surface waters. These will mainly be oils or cements but proper construction methodology can prevent this from occurring. The lessening of the water quality could have serious effects on the aquatic biota and could eventually lead to the contamination of the groundwater supply. Use of the dust control palliative should be avoided on all areas that should be revegetated. The effects of the palliative on any surface besides those of the roads are unknown but suspect.

The effects of increased access upon the surface water quality is difficult to assess at this time but could be detrimental unless some controls are applied. Water quality may be affected by increased sediment loads due to construction. If surface water rights are purchased, stream volumes may be locally reduced, but reduction of total surface water volume could be partially offset by return flow after treatment, especially during the operations phase.

Personnel and activities associated with M-X construction and operation will generate waterborne wastes. The discharge of these wastes after treatment could have an effect upon the water quality of the surface resources. Possible effects upon the surface water could be a reduction in dissolved oxygen present, an increase in nutrients or the introduction of toxic substances. All these can be avoided by the use of present technology in designing and constructing the waste treatment system.

Discharge of treated effluent may create new surface water resources. The water could provide a positive impact by creating new habit or providing a water source for agriculture.

EFFECTS ON GROUNDWATER RESOURCES (2.2.7)

If an operating base (OB) is located near Beryl, Utah, it would occupy approximately 6,000 acres, and include an airfield, support facilities, clear zones, a designated assembly area, an operational base test site, a designated transportation network, and a railroad spur. The Beryl site would be used for the first operating base in Alternatives 3 and 4 and for a second operating base in Alternative 1.

Construction

Construction activities similar to those in the DDA would require water. The quantities required depend upon the facilities constructed. The Beryl site could be a first of second OB depending upon the final alternative chosen. the facilities required for a first OB include the OB, DDA, and OBTS. There is no DDA or OBTS at the second OB. Estimated water demands for construction of an OB at Beryl are presented in Table 2.2.7-1.

Operation

The operational water requirements are presented in Table 2.2.7-2. The OB and community water requirements assume 80 percent of military personnel and dependents live on- base and 20 percent off-base.

The operating base requirements are essentially independent of the region. A first OB requires more water because additional people are required for the DDA and OBTS.

The operation of the OBs will cause an in-migration of people to work at the base and provide services to those working at the base. The people would settle in present communities near the OB site or new communities may be developed. Table 2.2.7-3 presents potential additional water demands in affected communities near the Beryl site. Demands are presented in acre-ft for convenience in determining the size of additional water rights needed.

Table 2.2.7-1. OB construction demands.

OB TYPE	OB CONSTRUCTION DEMANDS $x10^3$ ACRE-FT	
	RANGE	MPQ
First OB	2.0 - 3.6	2.8
Second OB	1.7 - 3.1	2.4

4050

Table 2.2.7-2. OB operational requirements.

OB TYPE	PEAK YEAR			PERMANENT		
	NUMBER	RANGE	MPQ[1]	NUMBER	RANGE	MPQ[1]
First OB						
Military-Living Offbase	1,700	0.10	0.10	1,700	0.10	0.10
Military and Dependents	17,100	2.9-3.8	3.8	17,100	2.9-3.8	3.8
Civilians	1,000	0.06	0.06	1,000	0.06	0.06
A & CO	4,500	0.4	0.4	0	-	-
Base and Construction Workers	0	-	-	0	-	-
Total		3.5-4.4	4.4		3.0-4.0	4 0
Second OB						
Military-Living Offbase	1,220	0.07	0.07	1,220	0.07	0.07
Military and Dependents	12,300	2.0-2.8	2.8	12,300	2.0-2.8	2.8
Civilians	900	0.06	0.06	900	0.06	0.06
A & CO	0	-	-	0	-	-
Base Construction Workers	0	-	-	0	-	-
Total		2.2-2.9	2.9		2.2-2.9	2.9

4051

[1]Most probable quantity.

Table 2.2.7-3. Increase in water demands at support communities.

BASE TYPE	ADDITIONAL DEMANDS IN NEARBY COMMUNITIES				
	COMMUNITY OR AREA	PEAK DEMANDS ($X\ 10^3$ AC-FT)		PERMANENT DEMANDS ($X\ 10^3$ AC-FT)	
		RANGE	MPQ[1]	RANGE	MPQ[1]
First OB	Milford	0.4-1.0	0.6	0.1-0.4	0.3
	Minersville	0.2-0.5	0.3	0.1-0.2	0.1
	Cedar City	0.8-2.3	1.4	0.4-1.0	0.6
	New Castle	0.2-0.6	0.4	0.1-0.2	0.2
	Near Base	1.6-2.9	1.8	0.5-1.2	0.7
	Enterprise	0.2-0.4	0.3	0.1-0.3	0.2
	St. George	0.2-0.4	0.3	0.1-0.3	0.2
Second OB	Milford	0.4-0.8	0.6	0.1-0.3	0.2
	Minersville	0.2-0.4	0.2	M-0.3	0.1
	Cedar City	0.7-2.8	1.1	0.3-0.7	0.4
	New Castle	0.2-0.7	0.3	0.1-0.2	0.1
	Near Base	0.9-3.3	1.4	0.4-0.9	0.6
	Enterprise	0.1-0.3	0.2	M-0.2	0.1
	St. George	0.1-0.3	0.2	M-0.2	0.1

4052

[1]MPQ = most probable quantity.

Potential Impacts

Various estimates of perennial groundwater yield have been published. They range from 5,000 to 25,000 acre-ft per year. Current consumption is 83,000 acre-ft per year (Don Price, 1979). Since groundwater usage from 1963 to 1977 averaged 79,000 acre-ft per year (Utah DWR, 1978), evidently substantial groundwater mining has been occurring. This groundwater mining is reducing the groundwater availability by removing water from storage and probably reducing the storage capacity by a permanent dewatering (compaction) of some areas. As substantial amounts of water are removed from storage, water quality will also be degraded by inducement of poor quality water to flow into the area and by removing water and leaving salts (evaportranspiration).

M-X impacts would be felt mostly by irrigated agriculture since irrigated agriculture makes up 80 percent or more of the total water usage (Price, 1979 and Utah, DWR, 1978). Impacts will increase pumping costs due to accelerated water level declines and reduced well yields.

An M-X operating base at the Beryl site would need water amounting to 6,000 acre-ft per year for 30 years. This usage would increase the current aquifer depletion rate (current usage above perennial yield - 48,000 acre-ft per year) by 13 percent, a very significant impact.

Relative potential for groundwater impacts at Beryl is moderate in comparison with other alternatives in Nevada/Utah.

Present water usage in the Beryl area greatly exceeds the perennial yield, and the Utah State engineer's office will not permit additional groundwater withdrawal appropriations in the area. M-X water usage for construction would equal 4.3 percent of present usage and 9.7 percent of perennial yield. Usage for operations would equal 5.3 percent of present usage and 12 percent of perennial yield. These withdrawals would further reduce groundwater levels, increase pumping lifts, and deplete groundwater storage. In general, springs in the valley are elevated above the valley fill aquifer and additional development of the groundwater basin should have no significant impact on spring flow in the area. The increase and stream-channel erosion may occur. Construction activities could degrade surfacewater quality during thunderstorms. Additional groundwater extractions could cause a slight degradation in groundwater quality in the area.

Mitigation Measures

Existing groundwater rights could be purchased or leased. To minimize the impact on the local environment, alternative sources of water would be evaluated. Potential well sites would be carefully selected to avoid interference with existing wells, and an experienced hydrogeologist would supervise the construction. The aquifer would be tested after well construction, and the effect of withdrawals on the local groundwater system would be monitored. A local surface drainage system and erosion control structures would be constructed to safely convey the runoff from the M-X operating base site to a regional drainage facility. Temporary retarding ponds would be built to reduce peak flows and to desilt and runoff to avoid downstream deposition. After completion of the M-X project, the water supply system may be made available for local use.

EFFECTS ON AIR QUALITY (2.2.8)

The Beryl OB site lies within 40 mi of Cedar City which is a nonattainment zone for sulfur dioxide (SO_2), thus any project requiring the combustion of fossil fuels could generate SO_2 emissions, and require mitigation to prevent excesses of the significance levels within the nonattainment area.

Construction

Figure 2.2.8-1 presents the PAL model results for two representative base construction daily activity area source sizes and two emission levels, unmitigated and mitigated. Emissions in this calculation include general construction activity (land clearing, blasting, ground excavation, and cut and fill operations) and does not include all of the vehicular traffic over unpaved roads, or stationary point, or fugitive emissions associated with producing and handling materials at the construction camp. The mitigation case assumes application of enough dust control treatment to reduce fugitive dust by 50 percent. This modeling effort indicates that Beryl will be affected by dust, but due to the model limitations the predicted dust concentrations shown as exceeding NAAQS standards are only a rough approximation.

Operation

For general operational emissions, the IMPACT model was run for two representative gaseous pollutants, CO and NO_x. The emission levels were scaled from data at Vandenberg AFB and redistributed to represent the expected operations base configuration. Vandenburg Air Force Base emissions were used since there was insufficient data on the operating base and facilities to generate M-X-specific OB emissions. The results show that CO reached an hourly concentration of 2.3 parts per million (ppm) and NO_x reached an hourly concentration of 0.18 ppm. (See Figure 2.2.8-2 and 2.2.8-3). The peak CO and NO_x concentrations occur at 0900, when light winds and stable atmospheric conditions result in poor pollutant dispersion. The CO values* are well below both the federal and Utah standards and no significant adverse impacts are anticipated. The maximum one-hour NO_x concentration of 0.18 ppm, while greater in magnitude than the federal and Utah annual standard, is anticipated to be of short duration and should not lead to any significant long-term impacts.

The emissions of SO_x and HC are expected to be less in magnitude than those of NO_x or CO. Since no violations of the standards are predicted for NO_x and CO, the same conclusion is predicted for SO_x and HC. The HIWAY model was used to examine the potential for local maxima of hydrocarbons, CO and NO_x associated with peak-hour traffic. The results are shown in Table 2.2.8-1. The maximum predicted 1-hour CO concentration of 8.5 ppm is well below the federal or Utah standard of 35 ppm. As there are no federal or Utah 1-hour NO_x standards, a direct comparison of the modeling results with standards is not possible. However, the estimated values are not anticipated to be of long duration. Predicted HC levels for the peak hour exceed the three-hour HC standard. It is possible that the peak 3-hour level will also exceed this standard. The HC standard is to be used as a

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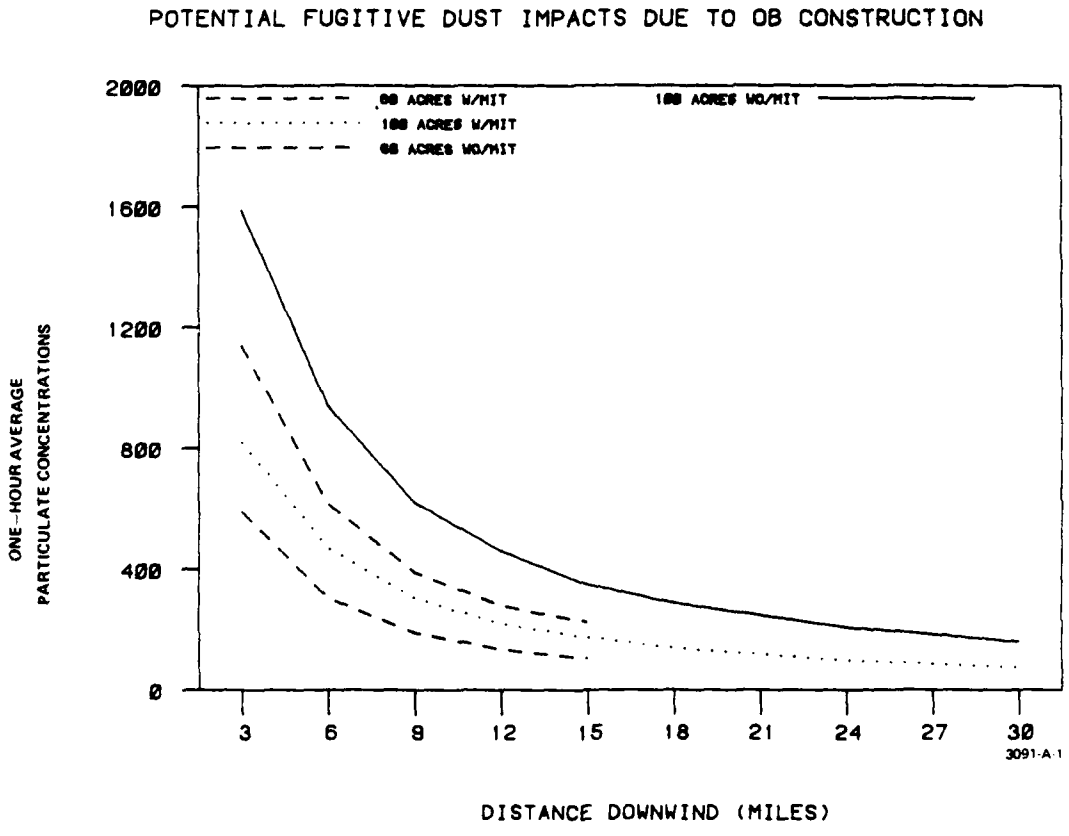
* The IMPACT model results are averaged over a grid which is 4,000 ft by 4,000 ft, and do not represent possible maxima.



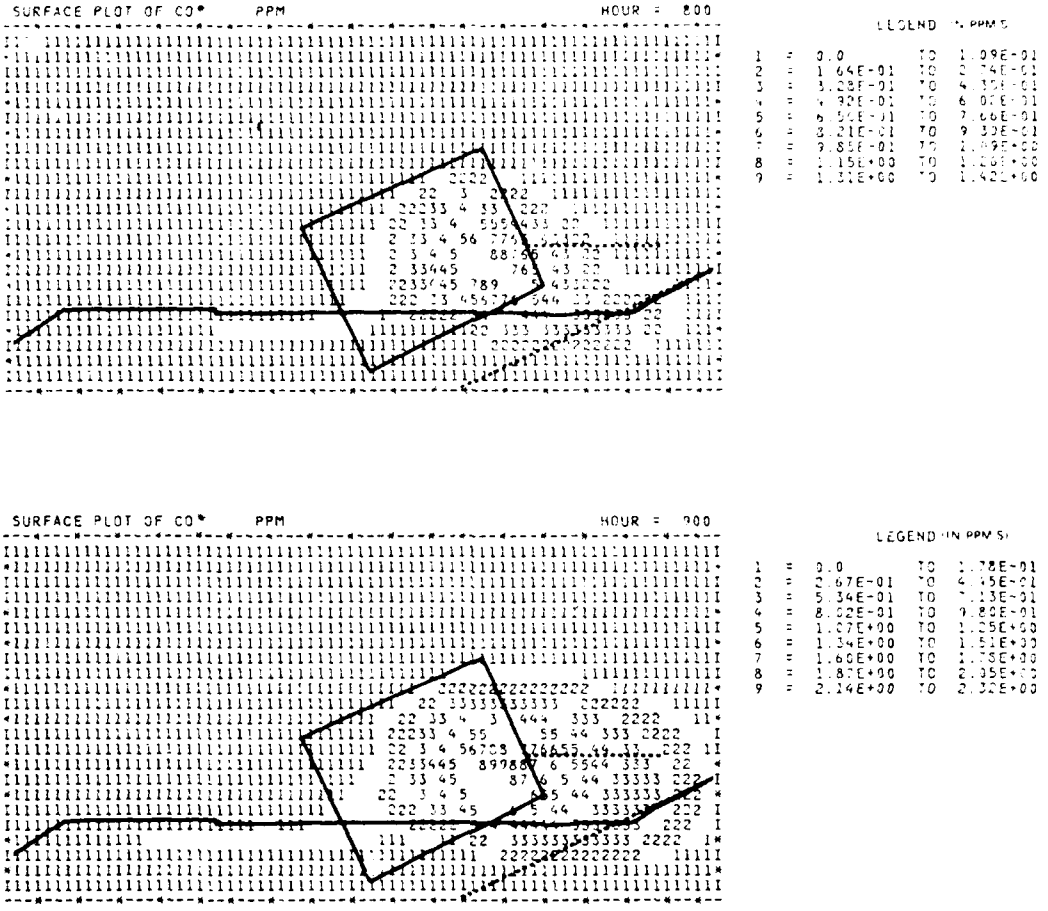
NOTE

1.) CONCENTRATIONS ARE 1-HOUR AVERAGES, REPORTED IN MICROGRAMS PER CUBIC METER

2.) METEOROLOGICAL CONDITIONS: WIND SPEED = 5 m/s, STABLE ATMOSPHERE, 500 METER MIXING HEIGHT

3.) CONCENTRATIONS REPORTED FOR 60 AND 100 ACRES OF CONSTRUCTION ACTIVITY

Figure 2.2.8-1. Potential fugitive dust impacts due to OB construction.



*NOTE THIS IS A SCHEMATIC REPRESENTATION OF THE DATA RESULTS PRESENTED IN THE SURFACE PRINT FOR THIS SITE BLANK SPACES INDICATE INTERMEDIATE VALUES BETWEEN ADJACENT INCREMENTS

2215 1-A

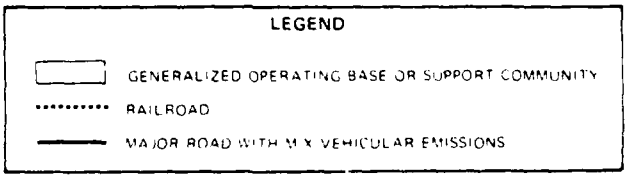


Figure 2.2.8-2. Predicted hourly CO concentrations at the Beryl OB site.

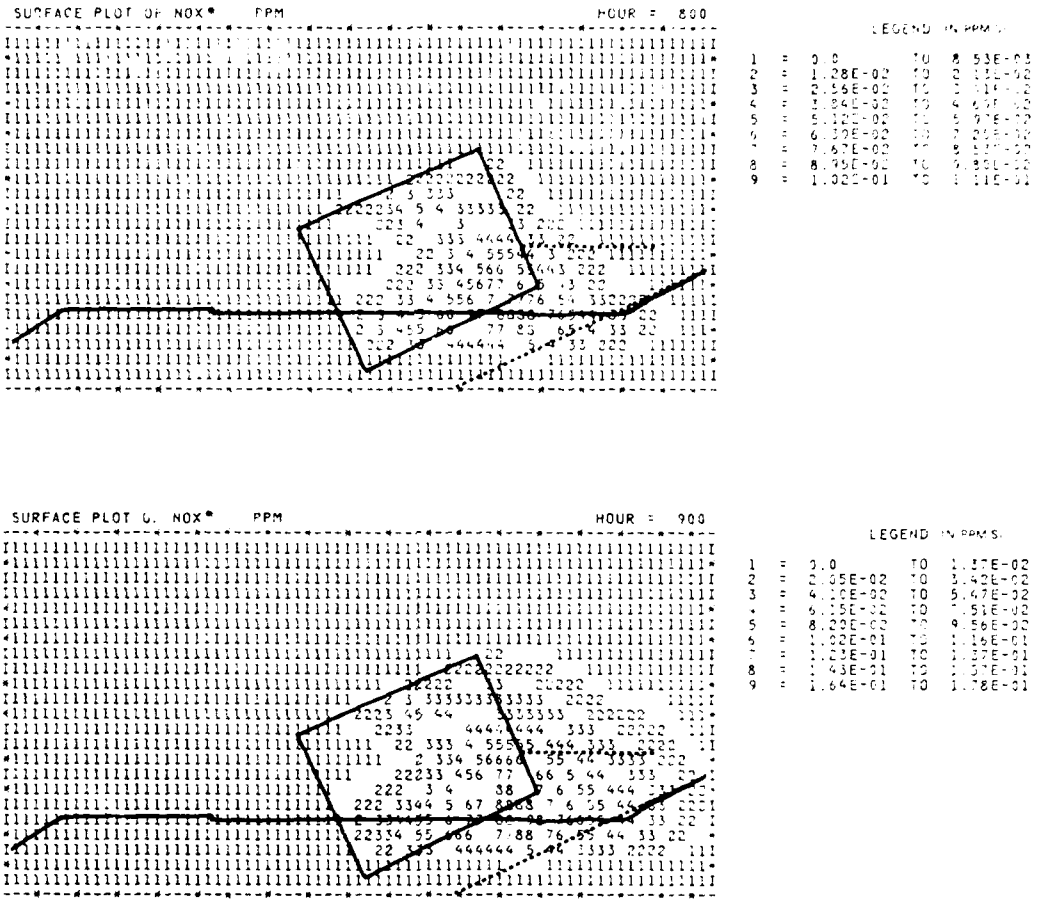


Figure 2.2.8-3. Predicted hourly NO_x concentrations at the Beryl OB site.

Table 2.2.8-1. Traffic-related concentrations.

	PEAK HOUR TRAFFIC VEHICLES/HR[2]	CO	HC	NO_x
Baseline	69	0.3 (371)	0.07 (47)	0.03 (64)
Baseline Plus M-X Induced Traffic	1,854	8.5 (9,801)	2.30 (1,541)	0.87 (1,640)

3038-1

[1]Worst case meteorological conditions: 1-meter per second wind, 25-meter mixing height, wind parallel to roadway, very stable atmosphere.

[2]Peak-hour traffic is assumed to be 15 percent of the Average Daily Traffic (ADT).

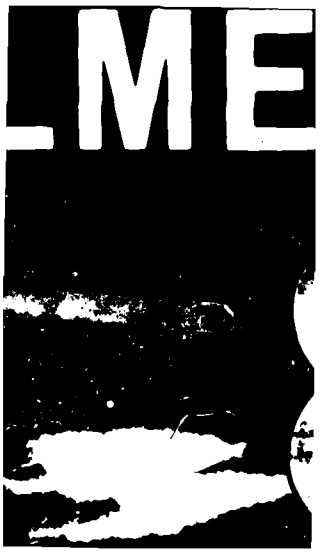
guideline for attaining the photochemical oxidant standard which is generally exceeded because of regional emission sources. The potential for oxidant impact due to HC and NO_x emissions will require sophisticated numerical modeling techniques.

Other pollutants with NAAQS are total suspended particulates, hydrocarbons, sulfur oxides, and lead. Emissions for these pollutants and resulting effects during operation are expected to be insignificant at the operating base due to the M-X. The construction of the OB will result in significant particulate levels for a temporary period. Particulate levels during construction of the OB will be similar to the effects predicted for the construction of roads and shelters in the deployment area where particulate levels were not predicted to cause standard violations.

MINING (2.2.9)

No mining sites are located in the vicinity of the proposed OB. There are some oil and gas leases on the site.

*U.S. GOVERNMENT PRINTING OFFICE : 1981 0-723/284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